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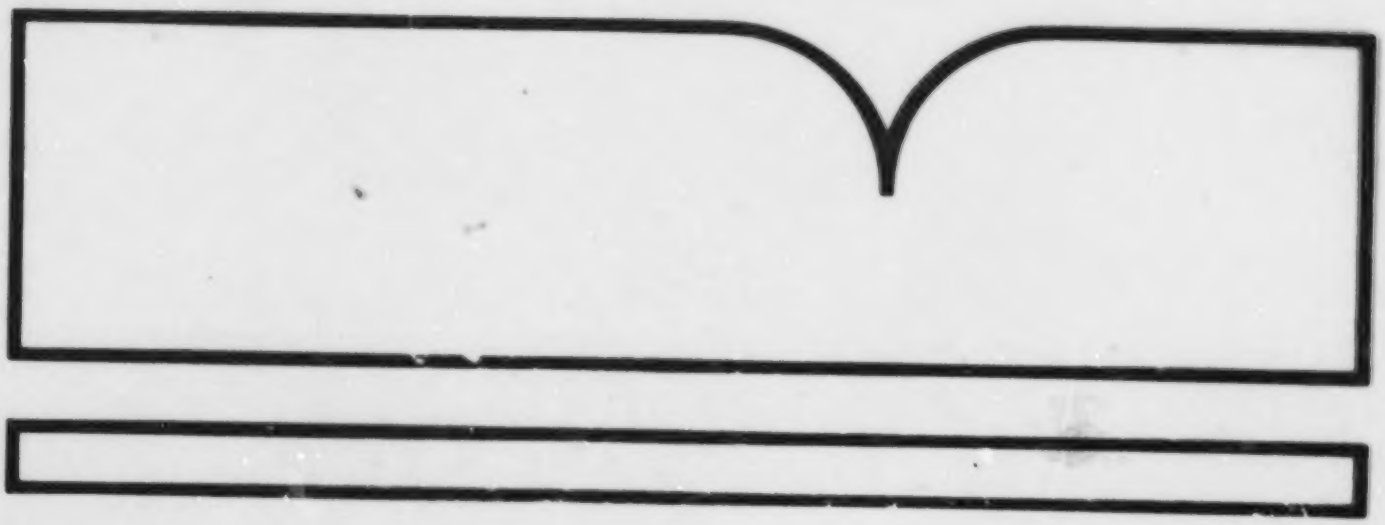
High-Altitude Adjustment Manual for Low-Altitude Vehicles

Radian Corp., Austin, TX

Prepared for

Environmental Protection Agency, Ann Arbor, MI

Sep 84



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This report was compiled to provide a compilation of high altitude performance adjustments for adapting to motor vheicles which were orginally intended for low altitude use. These performance adjustments were provided by the automobile manufacturers pursuant to section 215 of the Clean Air Act. Although in some cases a procedure may be similar to or the same as that for preparing new motor vehicles for high-altitude use, this manual is not intended for that purpose.

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RADIAN
CORPORATION

HIGH-ALTITUDE ADJUSTMENT MANUAL FOR LOW-ALTITUDE VEHICLES

Prepared For:

Technical Support Staff
Office of Mobile Source Air Pollution Control
2565 Plymouth Road
Ann Arbor, MI 48105

Prepared By:

Carolyn S. Smith
Radian Corporation
Austin, Texas

September 1984

8501 Mo-Pac Blvd. / P.O. Box 9948 / Austin, Texas 78766-0948 / (512) 454-4797

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INTRODUCTION

This manual provides instructions for adapting to high-altitude use those vehicles which were originally intended for low-altitude use. Although in some cases a procedure may be similar to or the same as that for preparing new vehicles for high-altitude use, this manual is not intended for that purpose.

These instructions assume that you have access to and are familiar with the shop manuals. With few exceptions, details are given only for unusual procedures. References to shop manuals are given for some procedures.

A typical format consists of first a table which lists a manufacturer's engine types by year. For each engine, the table lists the procedures to be performed on that engine -- in order. Specifications and/or part numbers may also be given. After the table, the procedures are described .

As an example, consider the following entry:

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1982			3	Advance Timing 4°
			10	Advance Choke Vacuum Break to 26°
		C1G5.0T4HGH2 C1G5.7T4HAC5 C1G5.7T4HHC8	4	Adjust Idle: Curb: MT: 700rpm, NEUTRAL AT: 600rpm, DRIVE Solenoid: MT: 700rpm, NEUTRAL

For any one of the three engines listed, first advance the timing 4° according to Procedure 3, then advance the choke vacuum break to 26° according to Procedure 10, then adjust the idle to the given specifications according to Procedure 4.

The following abbreviations are used uniformly:

MT - Manual Transmission
AT - Automatic Transmission
5/MT - 5-speed Manual Transmission
FED - Designed for 49-state or 50-state use.
CAL - Designed especially for sale in California.

Figures, if given, usually follow the procedure descriptions. The figure number "Figure 2-1" refers to the number one item on Figure 2.

When the high-altitude adjustments are complete, attach a Vehicle Emission Control Information Update Label:

- o Obtain the appropriate label from the dealer.
- o If necessary, briefly describe on the label the adjustments that were made.
- o Clean a place for the label in a prominent place adjacent to the Vehicle Emission Control Information Label.
  - DO NOT attach the label to any component that can be easily removed from the vehicle.
  - DO NOT remove the original Emission Control Information Label.
- o Attach the label.
- o If a clear plastic decal shield is supplied, apply it on top of the label.

ALFA ROMEO

Year	Engine Family	Applicable Procedures
84	EAR152 V5 F6VO	none
83	DAR152 V5 F49X	1
	DAR120 V5 F414	2,1
	DAR152 V5 F6VX	1
82	CAR152 V5 F6V9	1
	CAR120 V5 F4L3	2,1

PROCEDURE 1: Reset Idle.

- o Warm the engine.
- o Put the transmission in neutral.
- o Turn off all accessories.
- o Loosen the clamp on the throttle body.
- o Adjust the idle speed by turning the bhreaded ring.
- o Tighten the clamp on the throttle body.

PROCEDURE 2: Insert Connector Plug in Electronic Module Circuit.

- o Remove the panel covering the electronic control unit (ECU). behind the rear seat.
- o Insert the connector plug into the circuit of the electronic module.
- o Replace the cover panel.

AMERICAN MOTORS (RENAULT)

Year	Engine Family	Applicable Procedures
84	EAM 258 T2 HEAX (automatic)	1,3,4
	EAM 258 T2 HEAX (manual)	1,3,4,5
	EAM 2.8 T2 AXE2	1,3
	ERE 2.2 V5 FGA0 (Renault 18 i and fuego)	none
	EAM 2.8 T2 F4C9	none
83	DRE 1.6 V5 FZB9 (Renault 1.8 i and fuego)	6
	DRE 1.6 V5 FTC9 Code A (Fuego Turbo)	7
	DRE 1.4 V2 A4B1 (Le Car)	2,3
	DRE 1.4 V2 FRA6 (LeCar-California)	none
	DAM 151 T2 ABC0	1,3
	DAM 151 T2 FCA4	1,3
	DAM 258 V2 HDA6	1,3,4
	DAM 258 T2 HEBX	1,3,4
	DAM 360 T2 AAX8	2,3
	DAM 1.4 V5 FLD8	none
	DAM 1.4 V5 FKD6	none
	DAM 1.4 V5 F6D5	none
	DAM 150 TI FHE8	1,3,4
81	Renault 1.8 i	8
	LeCar	9
68-80	All AMC cars and jeeps	2,3
	All Renaults (49 states)	10

PROCEDURE 1: Advance Timing.

- Advance initial timing by 7°.

PROCEDURE 2: Advance Timing.

- Advance initial timing 5°.

PROCEDURE 3: Reset Idle.

- Reset the idle speed to original specifications on the VECI label and according to the procedures in the service manual.

PROCEDURE 4a (Jeep): Ground High-Altitude Input Circuit to Microprocessor.

- Untape the jumper wire from the harness of the fuel feedback microcomputer unit (MCU) in the engine compartment.
- Connect the jumper wire to the engine ground screw.

PROCEDURE 4b (Cars): Ground High-Altitude Input Circuit to Microprocessor.

- Move the carpeting away from the front passenger toeboard to expose the harness of the fuel feedback microcomputer unit (MCU).
- Untape the two-terminal connector from the MCU harness.
- Connect jumper wire 318 6890 (893600386 on earlier models) to the two-terminal connector.
- Reinstall the carpet.

PROCEDURE 5: Connect Idle/Decel Switch Vacuum Signal to Carburetor EGR Port.

- Disconnect the vacuum line (Figure 1-1) from the idle/decel switch and from the tee connector (Figure 1-2). Put this line in the glove box and inform the owner. DO NOT discard.
- Install cap 323 9420 over the open end of the tee connector (Figure 1-2).
- Cut the vacuum line (Figure 1-3) about 1-1/4 inches from the EGR CTO end of the line. Install tee connector 321 0891.
- Connect a 75-inch, 1/8 inch ID vacuum line (Figure 1-4) to the idle/decel switch and to the new tee connector in the vacuum line to the EGR CTO.

continued

PROCEDURE 6: Install Jumper Wire.

- Connect a jumper wire between pins 4 and 5 on the fuel injection diagnostic socket. (This connects pins 9 and 12 on the ECU and activates the altitude compensation component.)

PROCEDURE 7: Install Resistor Connector Board.

- Install a resistor connector board into the plug receptacle at the left front of the gear shift console.

PROCEDURE 8: Cancel the Full Throttle Contact Switch.

- Disconnect the electrical wiring connector from the throttle plate assembly (Figure 4-1).
- Remove the rubber boot (Figure 5-1).
- Hold the assembly so that the two locator grooves (Figure 5-2) on the connector are facing down as shown in Figure 5.
- Cut the signal wire (Figure 5-2) approximately 1-1/2 inch from the connector.
- Insulate the cut ends.
- Replace the rubber boot on the connector.
- Replace the connector on the throttle plate assembly.

PROCEDURE 9: Change the Air Compensating Jet.

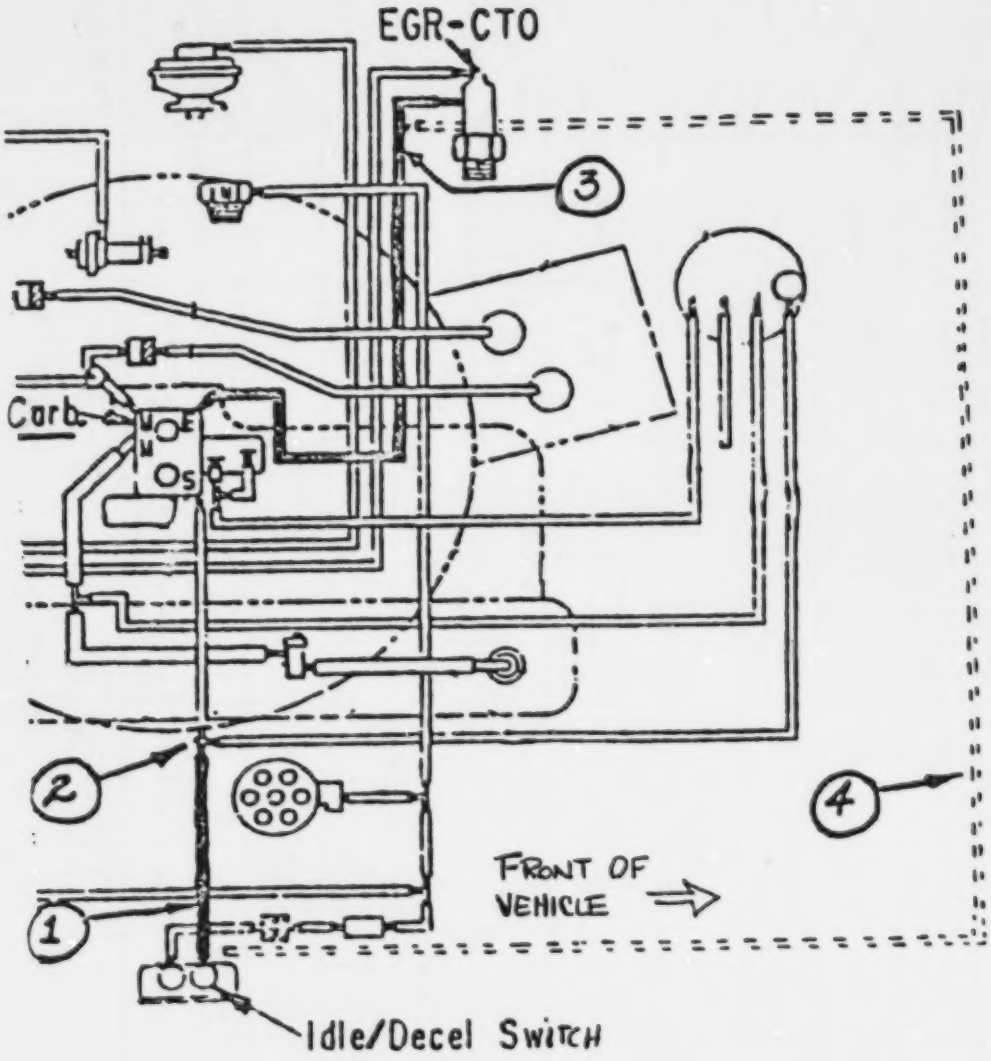
- Disconnect and remove the air intake filter.
- Remove the top bowl of the carburetor.
- Remove the 1.60 mm diameter air compensating jet (Figure 6-1) from the first barrel.
- Insert in its place a 1.80 mm diameter jet, RNUR 08701 102 303 (Weber 77201-180).
- Reinstall the top bowl (replace gasket if necessary).
- Reinstall the air intake filter.

continued

AMERICAN MOTORS (RENAULT) continued

PROCEDURE 10: Replace Carburetor Jets.

- Remove the carburetor air intake tube or air cleaner.
- Remove the carburetor top bowl.
- Replace the carburetor jets indicated in Figures 2 and 3.
- Reinstall the top bowl with a new gasket.
- Reinstall the air cleaner or air intake tube.



AMERICAN MOTORS

Figure 1. Modifying Low Altitude Model for High Altitude Operation.

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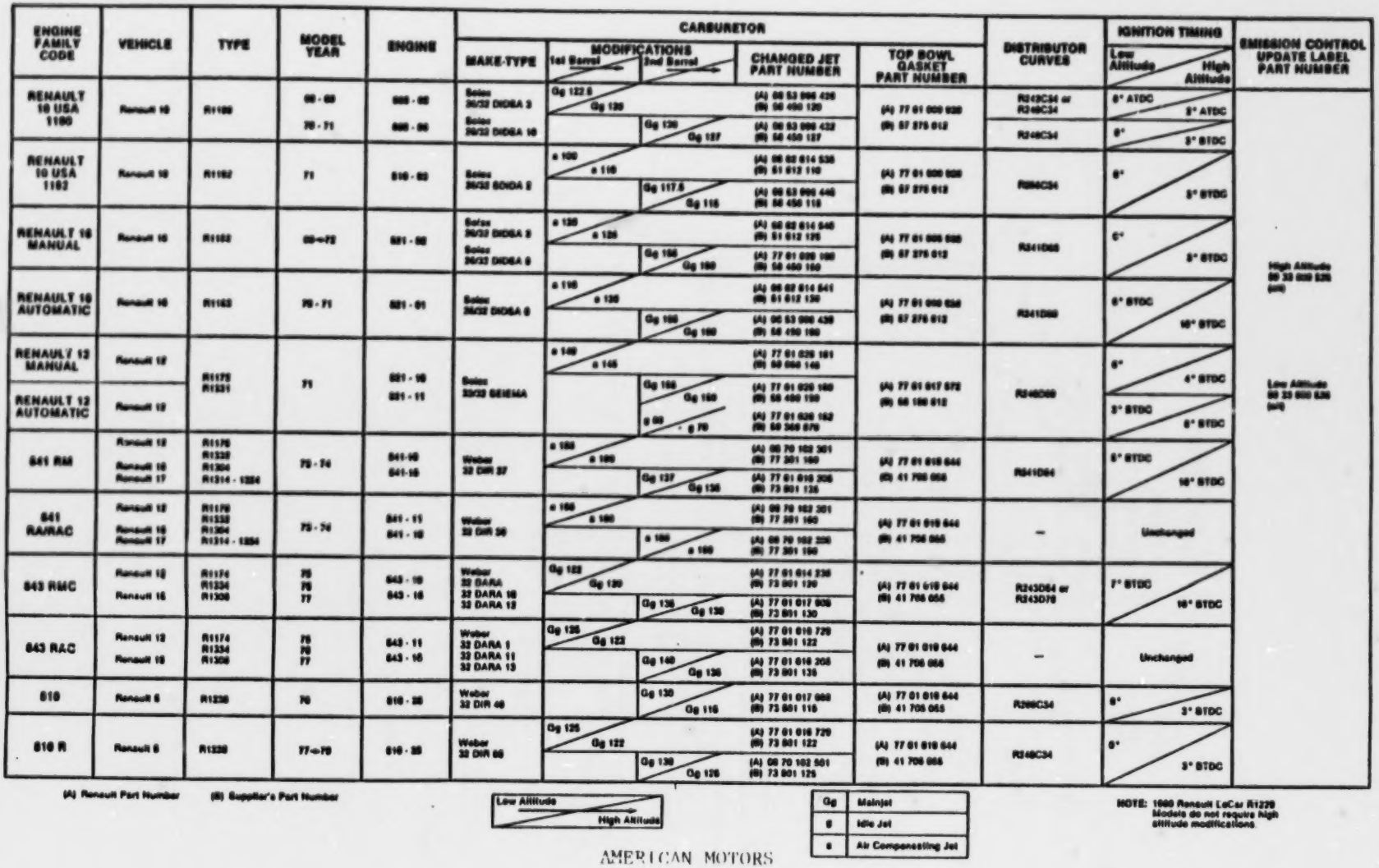


ENGINE FAMILY CODE	VEHICLE	TYPE	MODEL YEAR	ENGINE	CARBURETOR				DISTRIBUTOR CURVES	IGNITION TIMING	EMISSION CONTROL UPDATE LABEL PART NUMBER
					MAKE-TYPE	MODIFICATIONS 1st Barrel / 2nd Barrel	CHANGED JET PART NUMBER	TOP BOWL GASKET PART NUMBER		Low Altitude / High Altitude	
RENAULT 10 USA 1100	Renault 10	R1109	68 - 69 70 - 71	668 - 02 668 - 06	Solex 26/32 DIDSA 3 Solex 26/32 DIDSA 10	Gg 122.5 / Gg 120 Gg 130 / Gg 127	(A) 00 53 006 426 (B) 50 450 120 (A) 00 53 006 432 (B) 50 450 127	(A) 77 01 000 920 (B) 67 275 012	R243C34 or R246C34 R246C34	8° ATDC / 3° ATDC 8° / 3° BTDC	
RENAULT 10 USA 1102	Renault 10	R1102	71	810 - 02	Solex 26/32 BDSA 2	a 120 / a 110 Gg 117.5 / Gg 115	(A) 00 02 014 535 (B) 51 012 110 (A) 00 53 006 440 (B) 50 450 115	(A) 77 01 000 920 (B) 67 275 012	R284C34	8° / 3° BTDC	
RENAULT 10 MANUAL	Renault 10	R1102	69⇒72	821 - 02	Solex 26/32 DIDSA 3 Solex 26/32 DIDSA 8	a 130 / a 125 Gg 155 / Gg 150	(A) 00 02 014 540 (B) 51 012 125 (A) 77 01 000 100 (B) 50 450 150	(A) 77 01 000 920 (B) 67 275 012	R241D68	6° / 5° BTDC	High Altitude 00 53 000 526 (A/B)
RENAULT 10 AUTOMATIC	Renault 10	R1102	70 - 71	821 - 01	Solex 26/32 DIDSA 8	a 110 / a 120 Gg 155 / Gg 150	(A) 00 02 014 541 (B) 51 012 130 (A) 00 53 006 439 (B) 50 450 150	(A) 77 01 000 936 (B) 67 275 012	R241D68	6° BTDC / 10° BTDC	
RENAULT 12 MANUAL	Renault 12	R1170 R1331	71	821 - 10 821 - 11	Solex 32/32 GEIE14A	a 140 / a 145 Gg 155 / Gg 150 a 80 / a 70	(A) 77 01 026 101 (B) 50 050 140 (A) 77 01 026 160 (B) 50 450 150 (A) 77 01 026 162 (B) 50 300 070	(A) 77 01 017 072 (B) 50 150 012	R240D68	6° / 4° BTDC 3° BTDC / 6° BTDC	Low Altitude 00 53 000 526 (A/B)
RENAULT 12 AUTOMATIC	Renault 12										
841 RM	Renault 12 Renault 16 Renault 17	R1170 R1330 R1304 R1314 - 1324	70 - 74	841-10 841-15	Weber 32 DIR 37	a 150 / a 160 Gg 137 / Gg 135	(A) 00 70 102 301 (B) 77 301 160 (A) 77 01 010 306 (B) 73 001 135	(A) 77 01 010 644 (B) 41 706 055	R241D64	6° BTDC / 10° BTDC	
841 RA/RAC	Renault 12 Renault 16 Renault 17	R1170 R1330 R1304 R1314 - 1324	70 - 74	841 - 11 841 - 10	Weber 32 DIR 38	a 150 / a 160 a 160 / a 150	(A) 00 70 102 301 (B) 77 301 160 (A) 00 70 102 256 (B) 77 301 150	(A) 77 01 010 644 (B) 41 706 055	—	Unchanged	
843 RMC	Renault 12 Renault 16	R1174 R1334 R1308	75 76 77	843 - 10 843 - 15	Weber 32 DARA 32 DARA 10 32 DARA 12	Gg 122 / Gg 120 Gg 135 / Gg 130	(A) 77 01 014 236 (B) 73 001 120 (A) 77 01 017 935 (B) 73 001 130	(A) 77 01 010 644 (B) 41 706 055	R243D64 or R243D70	7° BTDC / 10° BTDC	
843 RAC	Renault 12 Renault 16	R1174 R1334 R1308	75 76 77	843 - 11 843 - 15	Weber 32 DARA 9 32 DARA 11 32 DARA 13	Gg 125 / Gg 122 Gg 140 / Gg 135	(A) 77 01 010 729 (B) 73 001 122 (A) 77 01 010 305 (B) 73 001 135	(A) 77 01 010 644 (B) 41 706 055	—	Unchanged	
810	Renault 6	R1230	70	810 - 35	Weber 32 DIR 46	Gg 130 / Gg 115	(A) 77 01 017 080 (B) 73 001 115	(A) 77 01 010 644 (B) 41 706 055	R266C34	8° / 3° BTDC	
810 R	Renault 6	R1230	77⇒79	810 - 35	Weber 32 DIR 66	Gg 125 / Gg 122 Gg 130 / Gg 125	(A) 77 01 010 729 (B) 73 001 122 (A) 00 70 102 501 (B) 73 001 125	(A) 77 01 010 644 (B) 41 706 055	R240C34	8° / 3° BTDC	

(A) Renault Part Number (B) Supplier's Part Number

Low Altitude → / High Altitude

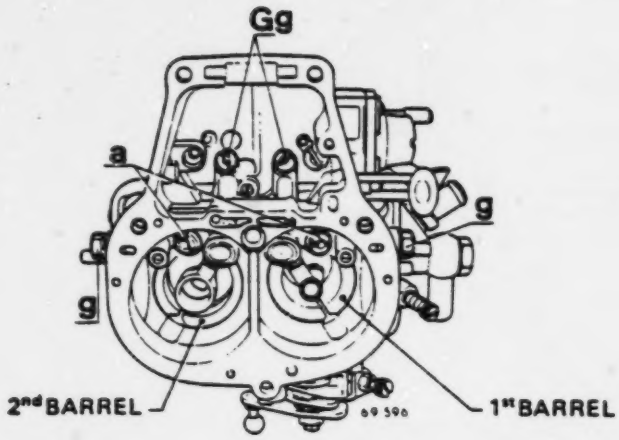
Gg	Mainjet
G	Idle Jet
a	Air Compensating Jet

NOTE: 1980 Renault LeCar R1229 Models do not require high altitude modifications

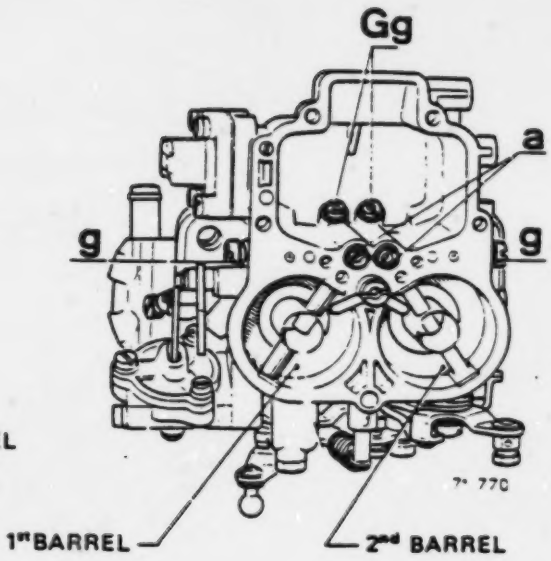
AMERICAN MOTORS

Figure 2. High Altitude Modifications Chart - 1968-80 Renault Vehicles

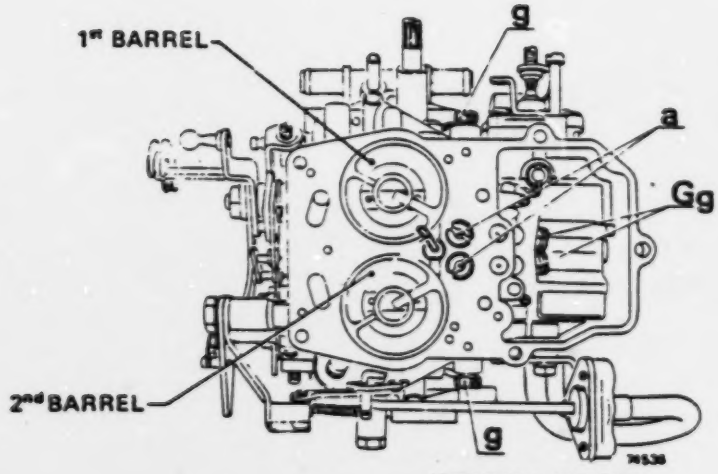
SOLEX
26/32 DIDSA - 26/32 SDIDA



WEBER
32 DIR - 32 DARA



SOLEX
32/32 SEIEMA



Main jet	Gg
Air compensating jet	a
Idling jet	g

AMERICAN MOTORS

Figure 3. Carburetors.

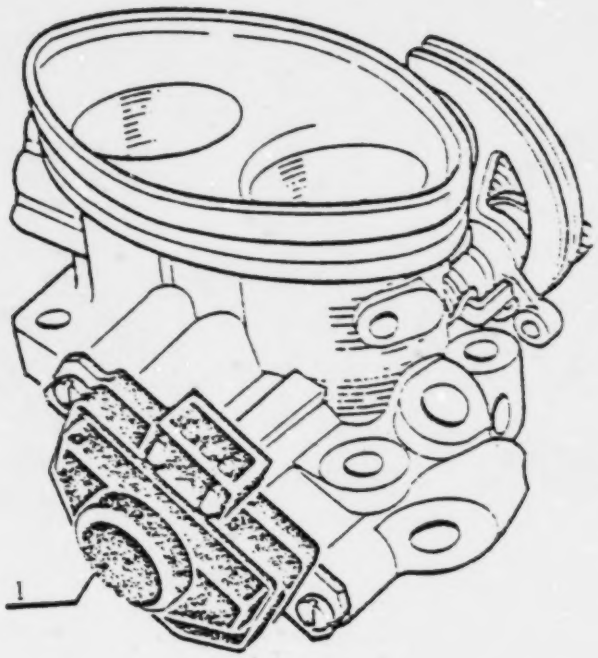


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Figure 4

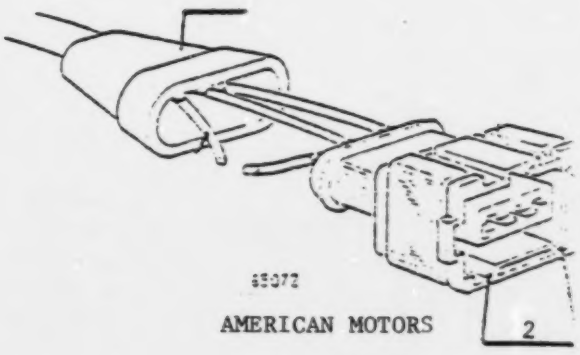
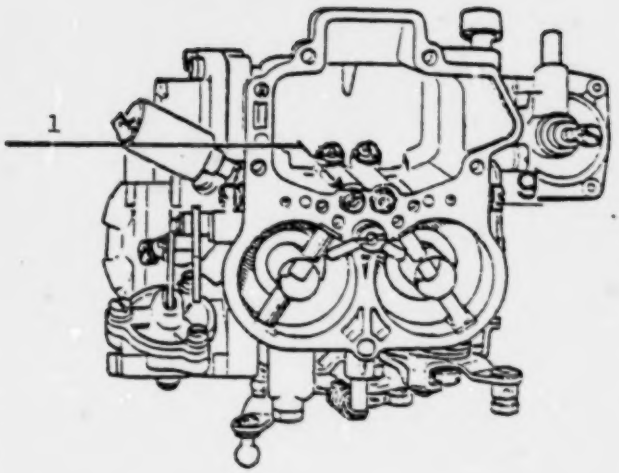


Figure 5



AMERICAN MOTORS

Figure 6

ASTON MARTIN

All 1982 models meet high altitude specifications. No modifications are required.

AURORA

All 1983 models meet high altitude specifications. No modifications are required.

BMW

Year	Engine Family	Applicable Procedure
82	CBM2.7 V5 FAB4	Adjust to low altitude idle CO-value.

CHRYSLER

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
84	Ram 50 Power Ram 50		1	Adjust timing 2.0L: 10° BTDC 2.6L: 12° BTDC
			2	New Primary Main Metering Jet 2.0L: MD608004#105 (Kit #MD081661) 2.6L/AT: MD600613#120 (Kit #MD081662) 2.6L/MT: MD608010#125 (Kit #MD081663)
83		1.6L (PSA) MT	3	New Carburetor 4227389
			4	New EGR Valve 4267246
			5	New ESA Unit 5213876
			6	Adjust Idle Curb: 925 rpm Idle Set: 900 rpm Propane: 900 rpm
		1.7L MT	6	Adjust Idle
			1	Adjust Timing
		2.2L AT	3	New Carburetor W/AC: 4227376 WO/AC: 4227375
			5	New ESA Unit 5213840
			7	New Coolant Temp. Switch 4145348
			1	Adjust Timing 6°BTC (Running Timing 16° BTDC)

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983 cont'd			6	Adjust Idle Curb: 850 rpm Idle Set: 850 rpm Propane: 900 rpm
			8	Remove Vacuum Delay Valve
			9a	New Vacuum Reducer Valve 4104184
		2.2L MT	3	New Carburetor 4227374
			5	New ESA Unit 5213862
			1	Adjust Timing 6° BTDC (Running Timing 16° BTDC)
			6	Adjust Idle Curb: 900 rpm Idle Set: 900 rpm Propane: 975 rpm
			8	Remove Vacuum Delay Valve
			9a	Install Vacuum Reducer Valve 4104184
			7	New Coolant Temp. Switch 4145348
		2.6L (MMC) AT	3	New Carburetor MD017307 Flange Gasket: MD025344
			10	Install High Altitude Compensator MD026708 Bracket: 5214335 Hose Harness: MD025243
			11	Install Hose Harness on EGR MD0 23646 Hose Clamp MD001843

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983 cont'd		3.7L 1BBL	5	Install ESA Module 4289059
			4	Install EGR Valve 4287554
			6	Adjust Idle: Idle Set: 730 rpm Propane: 805 rpm Fast Idle: 1800 rpm SIS Adjustment: 900 rpm
			12	Install Vacuum Kick Valve
			13	Install Chock Pull-Off Valve 4167046 or 4173433
		5.2L	1, 6	Adjust Idle Set, Propane Idle, & Timing to Low Altitude Specifications
	Rampage Scamp	2.2L	2	New Primary Main Metering Jet 4131173
			96	Install Vacuum Reducer Packages 4293794
			6	Adjust Idle AT MT Idle Set: 900 rpm 775 rpm Propane: 975 rpm 850 rpm H.F.I.: 1500 (S-3) 1500 (S-3)
	Truck	3.7L 225-1BBL	9	Install Vacuum Reducer Pckg. 4293798
			6	Adjust Idle AT MT Idle Set: 650 rpm 600 rpm Propane: 725 rpm 675 rpm H.F.I. 1600 (S-2) 1600 (S-2)

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983 cont'd	Truck w/aspira-tors	5.2L 318-2BBL	6	Adjust Idle Idle Set: 750 rpm Propane: 850 rpm H.F.I.: 1500 (S-2)
	Truck	5.2L 318-4BBL	14	New Secondary Metering Jets 3744772 (2 required)
			13	New Step-Up Spring 3621172
			4	New EGR Valve 4287675
			6	Adjust Idle Idle Set: 750 rpm Propane: 840 rpm H.F.I.: 1600 (S-2)
	Colt Challenger Sapporo		16	Modify Hose Harness Kit #MD069088
			1	Adjust Timing Basic: Colt: 10°BTDC Challenger/Sapporo: 12° BTDC
			6	Adjust Curb Idle
	Truck	2.0L 2.6L	2	New Primary Main Metering Jet 2.0L: #80 Kit #MD069089 2.6L, 5/MT: #95 Kit #MD069090 2.6L, AT: #100 Kit #MD069091
			1	Adjust Timing 2.0L: 10°BTDC 2.6L: 12°BTDC
			6	Adjust Curb Idle

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983 cont'd	Colt Ram-50	2.3L Turbo Diesel	17	Adjust Fuel Flow Rate Kit #MD064454
			18	Adjust Ignition Timing to TDC
			6	Adjust Idle to 750 ± 50 rpm Caution: do not disturb other screws
82	Miser	1.7L MT	6	Adjust Curb Idler to 810 rpm
			5	New ESA/EFC Module 5213542
			4	New EGR Valve 4287354 Gaskets: 4201313 4201384
			6	Adjust Propane Idle & Hot Fast Idle to Specifications
	Miser	1.7L AT	19	Remove Secondary Choke Blades
			6	Adjust Curb, Propane, & Hot Fast Idles to Specification
	M, Z, P, D, C, V	2.2L	5	New ESA/EFC Module MT: 5213544 AT: 5213546
			20 (MT only)	Remove Choke Vacuum Kick Delayer
			21 (AT only)	New Choke Vacuum Kick Delayer 4173433
			7 (AT only)	New Coolant Temp. Switch 4091719
			6	Adjust Propane and Hot Fast Idles to Specifications

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1982 cont'd	P, D, C, V	2.6L		Install Kit # MD034560 (Includes items below)
			3	New Carburetor MD026705 Flange Gasket: MD023544
			10	Install High Altitude Compensation MD026708 Bracket (not in kit): 5214335 Hose Harness: MD025243
			11	Install Hose Harness on EGR MD023646 Hose Clamp: MD001843
			6	Adjust CO Idle to Specifications
	B, F, G, S, X	3.7L 225 - 1BBL	3	New Carburetor 4227258
			10	Install High Altitude Compensator 4268561 Bracket: 4268499 Screw: 0181065 Nut: 6025004
			6	Adjust Propane, Curb, & Hot Fast Idles to Specification
	B, F, G, X, S	5.2L 318 - 2BBL	5	New ESA/EFC Module 4145980
			6	Adjust Propane, Curb & Hot Fast Idles to Specification
	EFI "Y" Body	318		New EFI Computer 4145701
			6	Reset "Idle in Drive" to Specifications

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1982 cont'd	Truck Miser Truck	3.7L 225-1BBL 225-2BBL	1	Adjust Timing to 16°BTDC
			6	Adjust Propane, Curb & Hot Fast Idle to Specifications
	Truck	5.2L 318-4BBL AT 3.5:1 Axle	22	Bypass OSAC Valve Connector: 4095598
			6	Adjust Propage, Curb, & Hot Fast Idle to Specifications
	Rampage	2.2L	6	Adjust Propane, Curb, & Hot Fast Idles to Specification
	Truck	3.7L (AT)		
	Truck	5.2L w/aspirator or AT		
	Truck	5.2L-4BBL MT		
1981		1.7L 4 cylinder	1 (AT only)	Adjust Timing to 12°BTDC
			6	Adjust Propane Curb, & Hot Fast Idle to Specifications
	All cars	2.2L 4 cylinder	1	Adjust Timing to 12°BTDC
				Remove Secondary Choke Blade (if equipped)
			6	Adjust Propane, Curb, & Hot Fast Idles to Specifications
	"K" Cars	2.6L	1	Adjust Timing to 12°BTDC
			17b	Modify EGR Hose Harness
			6	Adjust Curb Idle, CO Mixture & AC Idle Up Speed to Specifications

continued

CHRYSLER continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1981 cont'd	All Cars All LDT	225-1BBL	22 (AT cars only)	Bypass OSAC Valve Connector: 4095598
			1	Adjust Timing to 16°BTDC
			6	Adjust Propane, Curb, Hot Fast, & AC (if equipped) Idles to Specifications
	LDT	318-2BBL 318-4BBL 360-4BBL	1 (2BBL/AT only)	Adjust Timing to 12°BTDC
			22	Bypass OSAC Valve Connector: 4095598
1968-1980	Cars & Trucks		1	Adjust Timing According to Following Table
			6	Adjust Curb Idle, Idle Mixture, & Fast Idle to Specifications
			6A (1975-1979 only)	Adjust Propane Idle
			22 (225-6 cyl. only)	Bypass OSAC or Vacuum Spark Advance Solenoid if so equipped. Connector: 4095598
1980	Mitsubishi			None
1977	Mitsubishi		23	Turn the Manual Switch on the High Altitude Compensator to "on"
1971-1980	Mitsubishi	All (except listed above)	1	Adjust Ignition Timing According to Attached Schedule

continued

CHRYSLER

1968-1980 FEDERAL PASSENGER CAR HIGH ALTITUDE TIMING SETTINGS

ENG. - TRANS.		MODEL YEAR 68	69	70	71	72	73	74	75	76	77	78	79	80
170-1	Man.	5°B	5°B											
	Auto.	7.5°B	7.5°B											
198-1	Man.			12°B	12°B	12°B	12°B	12°B						
	Auto.			12°B	12°B	12°B	12°B	12°B						
225-1	Man.	10°B	10°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B			
	Auto.	10°B	10°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B			
273-2	Man.	5°B	5°B											
	Auto.	7.5°B	7.5°B											
318-2	Man.	5°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B	12°B			
	Auto.	7.5°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B	12°B			
318-2(Air Pump)	Auto.								8°B	8°B				
340-4	Man.	10°B	10°B	10°B	10°B	10°B	10°B							
	Auto.	12°B	12°B	12°B	12°B	12°B	12°B							
340-'6' Pk.	Man.				12°B									
	Auto.				12°B									
360-2	Man.				10°B	10°B	10°B							
	Auto.				10°B	10°B	10°B	12°B	12°B					
360-4	Man.							12°B	12°B	12°B	12°B			
	Auto.							12°B	12°B	12°B	12°B			
383-2 E 4-BBL	Man.	10°B	10°B	10°B	10°B									
	Auto.	12°B	12°B	12°B	12°B									
400-2	Auto.					12°B	12°B	12°B	12°B	12°B				
400-4	Man.					10°B	10°B	10°B						
	Auto.					12°B	12°B	12°B	12°B	12°B	12°B			

CHRYSLER

1968-1980 FEDERAL PASSENGER CAR HIGH ALTITUDE TIMING SETTINGS

ENG. - TRANS.		MODEL YEAR 68	69	70	71	72	73	74	75	76	77	78	79	80
440(A120)	Auto.	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B		
440(A134) H.P.	Man.	10°B	10°B	10°B	10°B	10°B								
	Auto.	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B	12°B			
440-'6' Pk.	Man.		10°B	10°B	10°B									
	Auto.		12°B	12°B	12°B									
426-2-4BBLS Street Hemi	Man.	10°B	10°B	10°B	10°B									
	Auto.	10°B	10°B	10°B	10°B									

CHRYSLER

1972-1980 CALIFORNIA PASSENGER CAR HIGH ALTITUDE TIMING SETTINGS

ENG. - TRANS.		MODEL YEAR								
		72	73	74	75	76	77	78	79	80
198-1	Man.	12°B								
	Auto.	12°B								
225-1	Man.	12°B	10°B	10°B	10°B	12°B	12°B	12°B	12°B	
	Auto.	12°B	10°B	10°B	10°B	12°B	12°B	12°B	12°B	
318-2	Man.	10°B	10°B	10°B	10°B	10°B	10°B			
	Auto.	10°B	10°B	10°B	10°B	10°B	10°B			
340-4 H.P.	Man.	10°B	10°B							
	Auto.	10°B	10°B							
360-2	Auto.	10°B	12°B							
360-4	Man.			12°B						
	Auto			12°B	12°B	12°B	12°B	12°B		
400-2	Auto.	12°B	12°B							
400-4	Man.	12°B	12°B	12°B	12°B	12°B				
	Auto.	12°B	12°B	12°B	12°B	12°B				
440(A120)	Auto.	12°B	12°B	12°B	12°B	12°B	12°B			
440(A134) H.P.	Man.	12°B	12°B	12°B	12°B	12°B	12°B	12°B		
	Auto.	12°B	12°B	12°B	12°B	12°B	12°B	12°B		

CHRYSLER

1968-1980 FEDERAL LIGHT DUTY TRUCK HIGH ALTITUDE TIMING SETTINGS

ENG. - TRANS.		MODEL YEAR												
		68	69	70	71	72	73	74	75	76	77	78	79	80
170-1	Man.	5°B	5°B											
	Auto.	7.5°B	7.5°B											
198-1	Man.			10°B	10°B									
	Auto.			10°B	10°B									
225-1	Man.	10°B	10°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B			
	Auto.	10°B	10°B	10°B	10°B	10°B	10°B	10°B	10°B	12°B	12°B			
318-2	Man.	5°B	10°B	7.5°B	7.5°B	10°B	10°B	10°B	12°B	12°B	12°B			
	Auto.	7.5°B	10°B	7.5°B	7.5°B	10°B	10°B	10°B	12°B	12°B	12°B			
360-2	Man.				10°B	10°B	10°B	10°B		12°B	12°B	12°B	12°B	
	Auto.				10°B	10°B	10°B	10°B		12°B	12°B	12°B	12°B	
360-4	Auto.												12°B	
383-2	Man.	10°B	10°B	10°B	10°B									
	Auto.	12°B	12°B	12°B	12°B									
400-2	Auto.					12°B	12°B							
440-4	Auto.							12°B						

CHRYSLER

1972-1980 CALIFORNIA LDT HIGH ALTITUDE TIMING SETTINGS

ENG. - TRANS.		MODEL YEAR								
		72	73	74	75	76	77	78	79	80
225-1	Man.	10°B	10°B	10°B	10°B	10°B	10°B			
	Auto.	10°B	10°B	10°B	10°B	10°B	10°B			
225-2	Man.							12°B		
	Auto.							12°B		
318-2	Man.	10°B	10°B	10°B	12°B	12°B	12°B			
	Auto.	10°B	10°B	10°B	10°B	10°B	10°B			
318-4	Man.								12°B	
	Auto.								12°B	
360-2	Man.	10°B	10°B							
	Auto.	10°B	10°B							
360-4	Man.			12°B	12°B	12°B	12°B	12°B	12°B	
	Auto.			12°B	12°B	12°B	12°B	12°B	12°B	
400-2	Auto.	12°B	12°B	12°B	12°B	12°B	12°B	12°B		
440-4	Auto.									

CHRYSLER

Model	Engine Liter (CID) / Altitude	Ignition timing at curb idle speed*	
		Low-Altitude	High-Altitude
1971	1.6 (97.5)	TDC±1°BTDC	5°±1°BTDC
1972		TDC±1°BTDC	5°±1°BTDC
1973		TDC±1°BTDC	5°±1°BTDC
1974	2.0 (121.75)	3°±1°BTDC	8°±1°BTDC
1975	1.6 (97.5)	TDC±1°BTDC	5°±1°BTDC
1976	2.0 (121.75)	3°±1°BTDC	8°±1°BTDC
1977	1.6 (97.5) 2.0 (121.75)	5°±1°BTDC	10°±1°BTDC
1978 1979	2.6 (155.92)	7°±1°BTDC	12°±1°BTDC
1980	1.4 (86.0) 1.6 (97.5) 2.0(121.75)	5°±1°BTDC	10°±1°BTDC
	2.6 (155.92)	7°±1°BTDC	12°±1°BTDC

* The curb idle speed remains unchanged between low- and high-altitudes. Refer to the Vehicle Emission Control Information Label affixed to the underhood of the vehicles.

NOTE: All procedures are optional and an owner expense unless otherwise noted.

PROCEDURE 1: Adjust Timing.

- o Adjust the timing to the given specifications.

PROCEDURE 2: Replace Primary Main Metering Jet.

- o Remove the existing primary main metering jet and give it to the customer.
- o Install a new primary main metering jet of the part number listed. Use a screwdriver with a blade width less than 4.5 mm. An expandable tip is recommended to prevent air bleed from being dropped into the carburetor bore.

PROCEDURE 3: Replace Carburetor.

- o Remove the existing carburetor and give it to the customer.
- o Install a new carburetor of the part number listed. A new flange gasket may be required.

PROCEDURE 4: Install EGR Valve.

- o Install an EGR valve of the part number listed.

PROCEDURE 5: Install ESA Unit.

- o Install an ESA unit of the part number listed.

PROCEDURE 6: Adjust Idle.

- o Adjust the idle to the low-altitude specifications on the original VECI or to the alternative specifications given.

PROCEDURE 7: Replace Coolant Temperature Switch.

- o Remove the existing coolant temperature switch and give it to the customer.
- o Install a new coolant temperature switch of the part number listed.

continued

PROCEDURE 8: Remove Vacuum Delay Valve.

- Remove the vacuum delay valve from the vacuum kick diaphragm hose.

PROCEDURE 9a: Install Vacuum Reducer Valve.

- Install in the EGR hose a vacuum reducer valve of the part number listed.

PROCEDURE 9b: Install Vacuum Reducer Package (Nylon Vacuum Hose Harness).

- Carefully cut the tape from around the vacuum harness convoluted tubing at the end closest to the coolant switch.
- Peel the convoluted tubing away from the nylon tubes and cut 2 inches from the front of the engine clip that mounts the vacuum harness to the air pump pulley cover. Discard the cut piece of convoluted tubing.
- Locate the nylon vacuum tube running from the CVSCC (CCEGR) coolant switch on the side of the water control box nearest to the white dot on the connector.
- Cut the tube located in the previous step 2.5 inches from the CVSCC and 2.5 inches from the vacuum harness mounting clip. When cutting the nylon hose, use a sharp razor so the hose won't kink. Discard the unused hose.
- Install the small end of the in-line connector, PN 4179391, on the cut end of the nylon tube closest to the CVSCC.
- Install the small end of the elbow connector, PN 4213774, on the cut end of the nylon tube closest to the harness mounting clip. Orient the elbow connector so that the 3/16 inch end is pointed toward the CVSCC.
- Install the vacuum reducer valve, PN 4104184, white nipple, between the connectors installed in the previous steps. Position the vacuum reducer valve so that the third nipple points downward.
- Locate the blue striped vacuum hose in front of the carburetor.
- Cut the blue striped hose 2.5 inches from the air pump pulley cover, approximately in front of the air cleaner mounting bracket. Insert a tee, PN 4104172.
- Cut an 18 inch length of 3/16 rubber hose, bulk stock PN 3780507, and install it on the tee. Route this hose over the valve cover next to the air pump pulley cover. Between the engine and the vacuum harness, loop the hose about 2.5 inches from the vacuum reducer valve.
- Connect the hose to the remaining nipple.
- Tape the four nylon vacuum tubes together at the edge on the in-line connector.

continued

PROCEDURE 9c: Install Vacuum Reducer Package (3.7L Engine).

- Cut two 1.5 inch sections of 3/16 inch hose, bulk stock PN 3780507, and install them on the white nipples of the vacuum reducer valve, PN 4114184.
- Install the in-line connectors on the hoses with the large end to the hose.
- Cut one 8 inch length of 3/16 inch hose and install it on the remaining nipple of the vacuum reducer valve.
- Install the tee, PN 4104172, at the other end on the 8 inch hose.
- Locate the orange striped hose connecting the vacuum amplifier in the vacuum solenoid. Cut this hose 2.5 inches from the solenoid and install the tee of the vacuum reducer subassembly.
- Locate the vacuum hose harness bundle running along the inside of the valve cover. Cut the yellow striped hose midway between the two tape wraps.
- Install the vacuum reducer sub-assembly.

PROCEDURE 10: Install High-Altitude Compensator.

- Install a high-altitude compensator of the part number listed. See Figure 1 for 1982 models B, F, G, S, and X.

PROCEDURE 11: Install EGR Hose Harness.

- Install on the EGR a hose harness of the part number listed.

PROCEDURE 12: Install ESA Module.

- Install an ESA module of the part number listed.

PROCEDURE 13: Install Vacuum Kick Valve.

- Install a vacuum kick valve in the vacuum hose.

PROCEDURE 14: Install Choke Pull-Off Valve.

- Install in the vacuum hose a choke pull-off valve of the part number listed.

continued

PROCEDURE 15: Replace Secondary Metering Jets.

- Remove the existing secondary metering jets and give them to the customer.
- Install new secondary metering jets of the part number listed.

PROCEDURE 16: Install Step-Up Spring.

- Remove the step-up piston cover plate attaching screw and cover plate.
- Remove the rod connecting the choke shafts.
- Remove the metering rod cover plates.
- Remove the step-up piston and link assembly with the step-up rods.
- Remove the step-up piston spring.
- Install step-up spring.
- Reassemble the carburetor in reverse order.
- Readjust the secondary air valve spring wrap-up tension adjustment to 4-1/2 turns after valve contact with the stop. Use the air door adjustment procedure outlined in the service manual.

PROCEDURE 17a: Modify Hose Harness.

NOTE: Refer to Figures 2,3, and 4.

- Remove the connector "I" from thermo valve "A".
- Cut all three hoses off of connector "I".
- Reinstall upper vacuum hose "E" on thermo valve nipple "E".
- Cap nipple "A" on thermo valve "A" with the supplied rubber cap.
- Cut vacuum hose "B" 2-23/64 inches from the end of the hose at connector "I" and install the supplied vacuum hose terminal.
- Connect the vacuum hose "A" on hose terminal (tee) nipple "B".

continued

PROCEDURE 17b: Modify Hose Harness.

NOTE: Refer to Figures 5 and 6.

- o Remove the yellow and blue striped vacuum hose connector "I" from thermo valve "A".
- o Cut the molded rubber connector off of the yellow and boue striped hoses just removed.
- o Reattach the yellow striped vacuum hose to the outside nipple of thermo valve "A".
- o Cap the inside nipple of thermo valve "A" with the rubber cap, PNMD part number MD062284 ordered separately.
- o Cut vacuum hose "E" (blue striped) about 1-1/4 inch from the hose harness bracket and install the "T" connector in MD062284.
- o Install the loose blue striped vacuum hose from the first step above on the open nipple of the tee just installed in vacuum hose "E".

PROCEDURE 18: Adjust Fuel Flow Rate.

- o Loosen the nut on the fuel flow adjustment screw on the injection pump.
- o Insert the adjusting shim from the kit between the nut and the washer. DO NOT REMOVE the not or the screw.
- o Turn the adjusting screw inward to the stop and, while holding the screw, thghten the nut to a torque of 4.3 to 6.5 foot pounds.

NOTE: Make sure the nut and the locking sleeve are tight against one another. Otherwise, the engine will not run properly.

PROCEDURE 19: Adjust Injection Timing.

- o Loosen (DO NOT remove) the nuts and bolts securing the injection pump.
- o Loosen (DO NOT remove) the nuts securing the injection pipes (4 in all) on the side of the injection pump. When loosening the nuts, hold the delivery valve holder with a spanner to prevent it from rotating with the nut.

continued

PROCEDURE 19 continued

- Make sure that the push rod is protruding by 10 mm (0.4 inch). The protrusion of the push rod can be adjusted with an inner nut.
- Remove the plug from the rear of the injection pump and attach the prestroke measuring adapter and a dial indicator. DO NOT overtighten the gauge to the adapter; if you do, the readings will be erratic.
- Turn the crank pulley to such a position that the notch on the pulley is at approximately 30° before TDC.
- Set the dial indicator to zaro.
- Slightly turn the crank pulley clockwise and counterclockwise to make sure that the dial indicator does not deviate from the zero position. If it does, readjust the pulley position so that the notch on the pulley is at 30° before TDC.
- Turn the crankshaft in the normal direction (clockwise) to bring the notch to specification.
- Make sure that the dial indicator reads 1± 0.03 mm (0.0394 ± 0.0011 inch). If the dial indicator does not indicate the specified value, tilt the injection pump body to the right or left until the the above reading is reached.
- Temporarily tighten the bolts securing the injection pump.
- Repeat steps 2 through 7 above to check that the adjustment has been made correctly.
- Remove the prestroke measuring adapter, fit the plug, and tighten both the plug and the four injection pipe nuts.

PROCEDURE 20: Remove Choke Vacuum Kick Delayer.

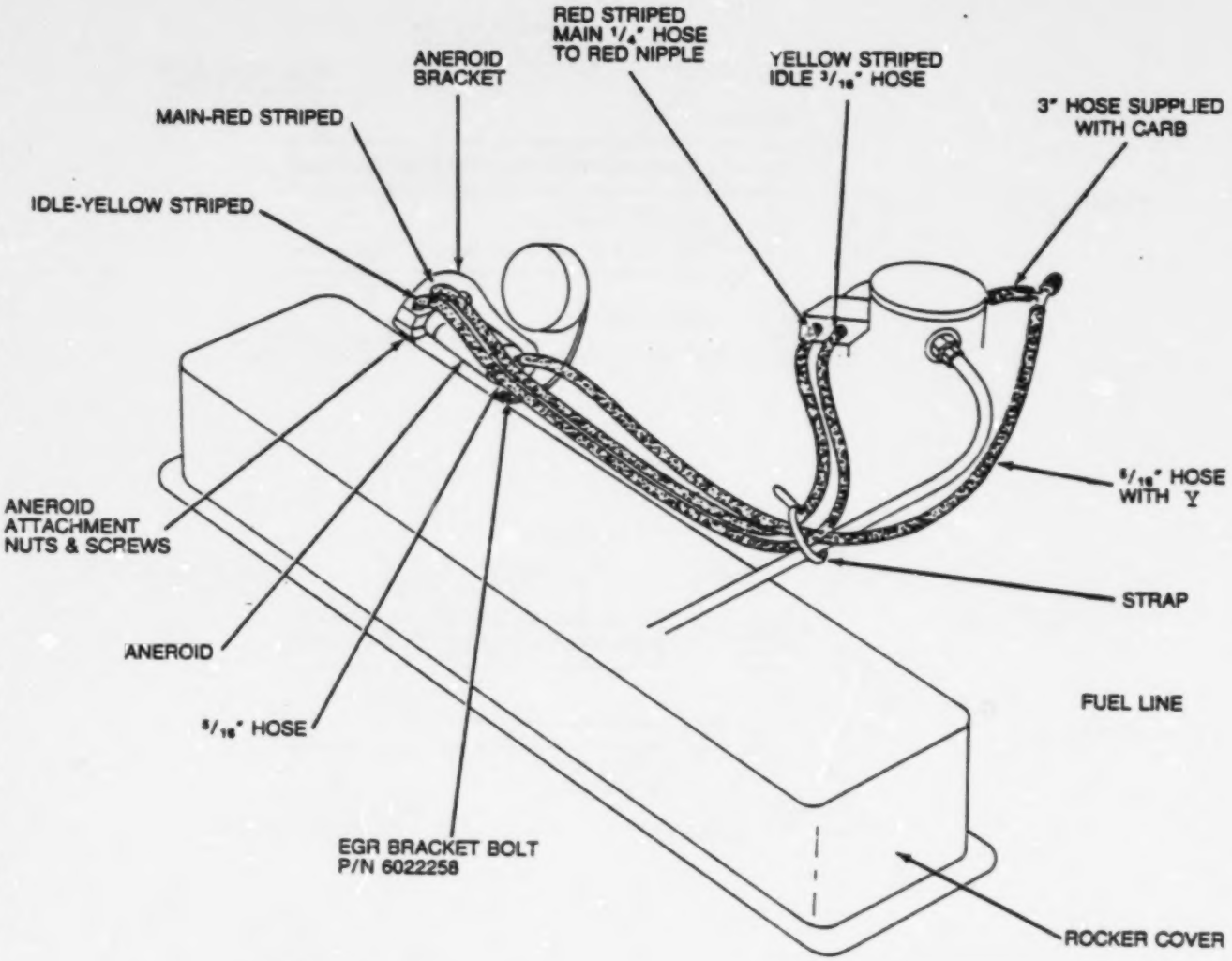
- Remove the choke vacuum kick delayer.

PROCEDURE 21: Replace Choke Vacuum Kick Delayer.

- Remove the existing choke vacuum kick delayer.
- Install a new vacuum kick delayer of the part number listed.

PROCEDURE 22: Bypass OSAC Valve.

- Bypass the OSAC valve by removing the two hoses at the valve and connecting them with the connector of the part number listed.



CHRYSLER FIGURE 1: Installation of 225-1 Altitude Compensator on Models B, F, G, S, and X

FIGURE 2

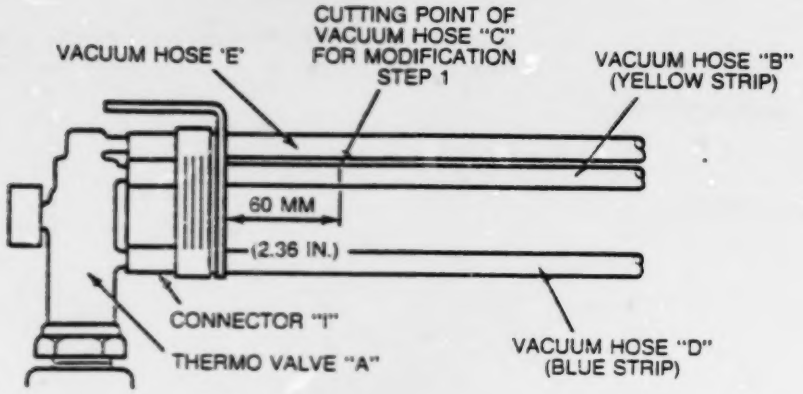


FIGURE 3

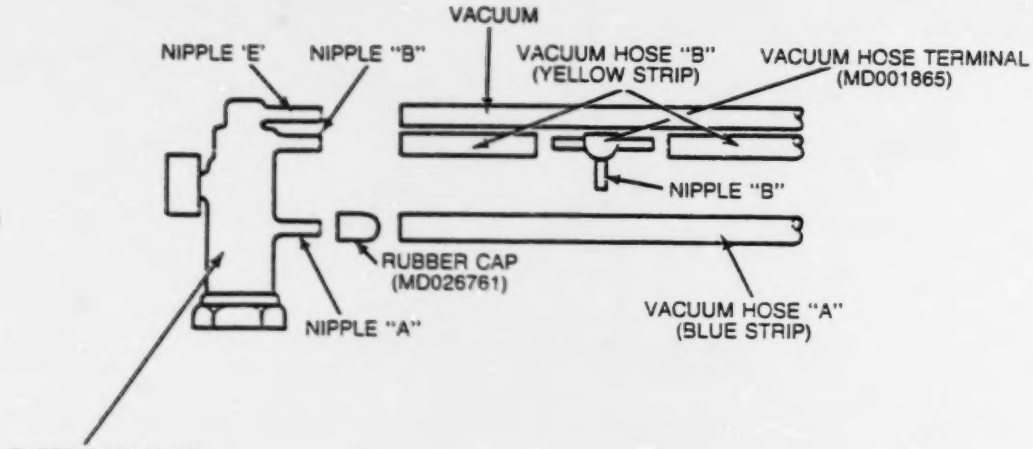
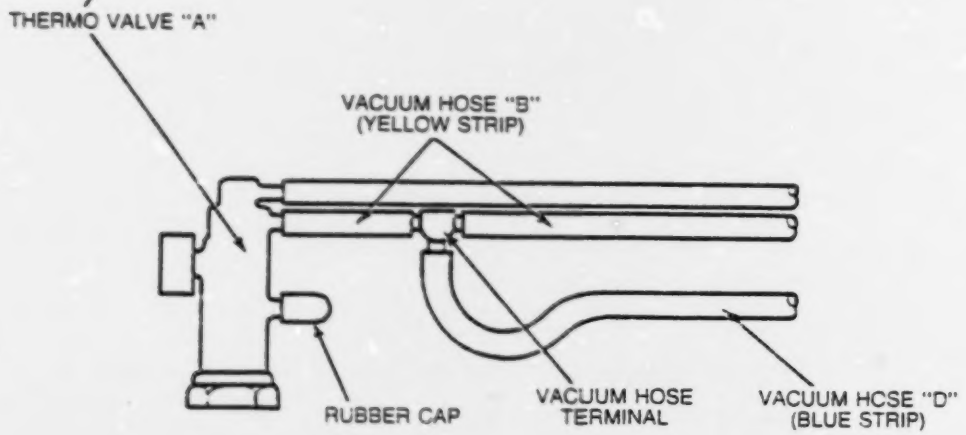
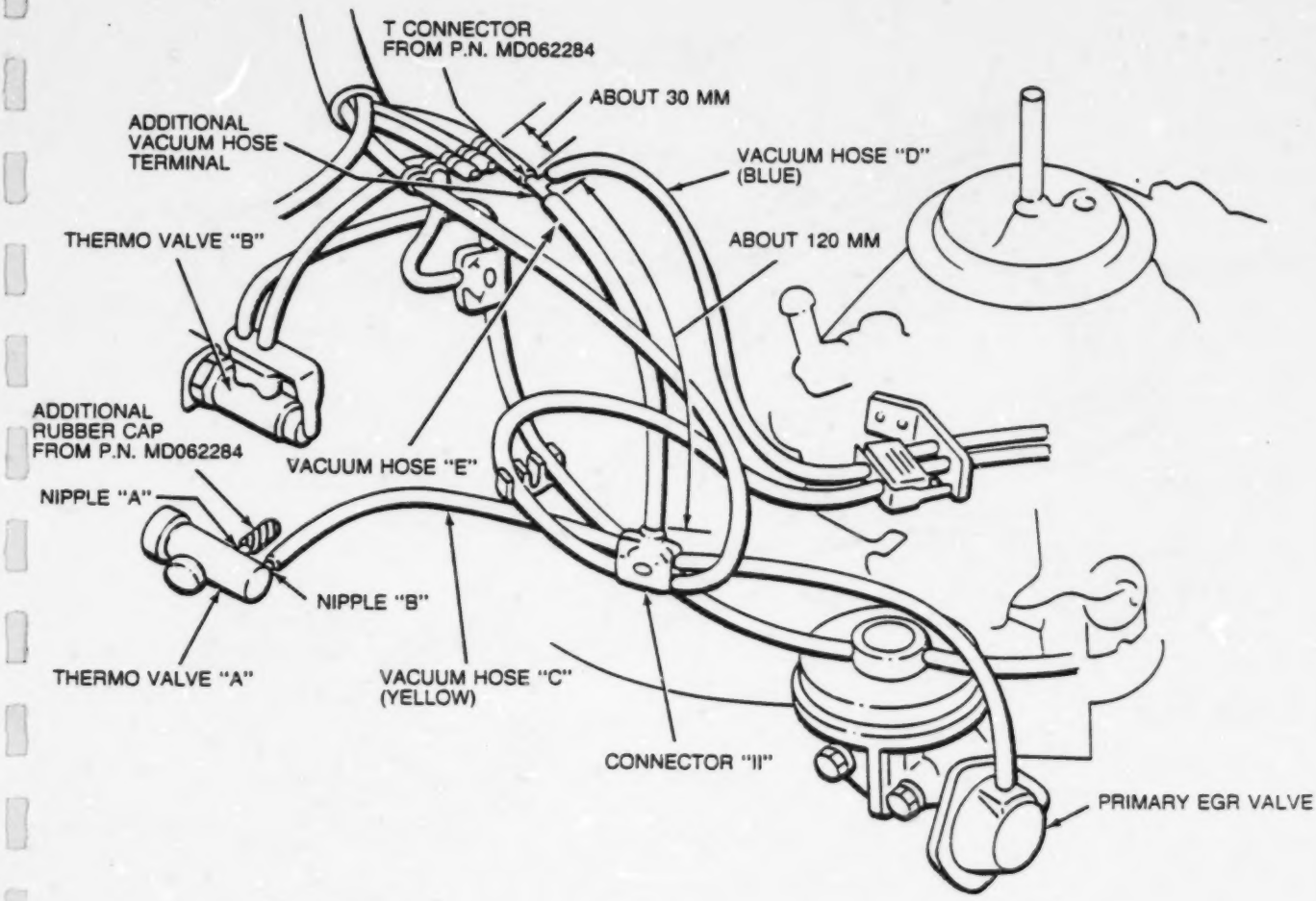


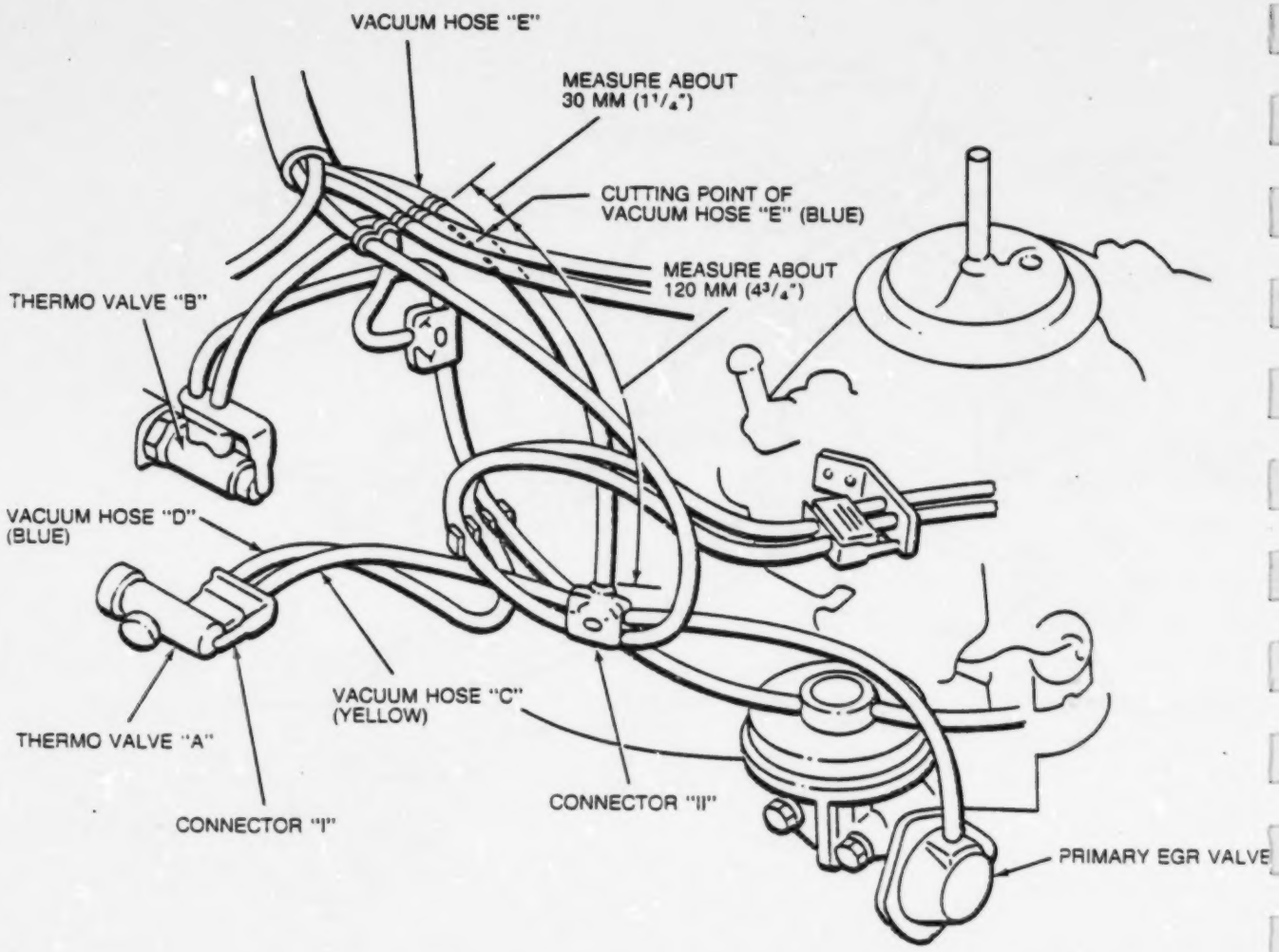
FIGURE 4



CHRYSLER: Modification of Thermo Valve Vacuum Hose Assembly.



CHRYSLER FIGURE 5: Hose Modification



CHRYSLER FIGURE 6: Hose Modification

DATSUN

1981 Diesel 810

PROCEDURE: Replace EGR Guide Tube.

- o Remove the nut which secures the EGR tube to the EGR control valve.
- o Disconnect the tube from the valve.
- o Disconnect the vacuum hose.
- o Remove the nuts which mount the EGR control valve to the intake manifold.
- o Remove the EGR control valve.
- o Remove the EGR guide tube.
- o Install a high-altitude EGR guide tube, which has a smaller EGR flow restriction to reduce the EGR flow rate.
- o Reinstall the EGR control valve. NOTE: ALWAYS replace the EGR gaskets.
- o Reconnect the vacuum hose.
- o Reinstall the EGR tube to the EGR control valve.
- o Make sure the exhaust gas does not leak from the gasket or the tube connection.

PROCEDURE:

- Replace the warm-up and control pressure regulator (0 438 140 083) with a new regulator (B 438 149 474).
- Warm up the engine.
- Check the idle speed. If necessary, adjust it according to the procedure in Section 17.02.00.00, page 06.01-8 in the manual.

FIAT LANCIA

Year	Electronic Control Unit	Applicable Procedures
82	0.280.000.207	1,3
	0.280.000.208	1,3
	0.280.000.190	2a,1,3
	0.280.000.191	2b,1,3
81	All	none

PROCEDURE 1: Join Electrical Leads.

- o Join the free leads near the electronic control unit (see detail in owner's manual).

PROCEDURE 2a: Replace Electronic Control Unit.

- o Replace the existing electronic control unit with part number 0.280.000.207.

PROCEDURE 2b: Replace Electronic Control Unit.

- o Replace the existing electronic control unit with part number 0.280.000.208.

PROCEDURE 3: Check and Adjust Idle.

- o Warm up the engine.
- o Check the idle speed. Adjust the idle speed, if necessary, according to the instructions in the manual.

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
84	4.9L	1	New PCV valve: EV-49 (D8TZ-6A666-B)
		2	Advance timing 4°
		3	New transmission diaphragm: D8AZ-78377-A Clip: D7FZ-7F006-A
		13	Adjust idle
	5.0L TAF 4.53 F,G,K,L 4.54 E,F,L,J	1 (except Canadian)	New PCV valve: EV-68 (D90Z-6A666-A)
		5 (except Canadian)	New air pump pulley: D4ZZ-9B447-A
		6 (except Canadian)	New air pump drive belt: 40-60 amp alternator: D5PZ-8620-C 70-100 amp alternator: EOPZ-8620-C
		2	Advance timing 4°
		3	New transmission diaphragm: D8AZ-7A3777-A
		13	Adjust idle
83	2.3L 3.05 A,H 3.06 A,H (non-feedback)	2	Adjust timing to 14° BTDC
		12	Insert T-bleed and filter: E1ZZ-6C600-A
	2.3L 3-5 C,N,P 3-6 N	4	Connect MCU
		2(3-6 N only)	Advance timing 5°
cont'd		1	New PCV valve: EV-94-6A666-

continued

FORD continued

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
83	3.8L 2-55 D 2-56 D 3-55 D 3-56 D	7	New accelerator pump rod: E1PZ-9F687-A
		8	Remove pullover air bleed
		9(2-55 D only)	Reposition choke rod/lever
		2	Advance timing 6°
		3	New transmission diaphragm: D7DZ-7A377-A Clip: D8BZ-7F006-A
		13	Adjust idle
	4.9L Under 8500 lbs except CA	1	New PCV valve: EV-49 (D8TZ-6A666-B)
		2	Advance timing 4°
		3	New transmission diaphragm: D7DZ-7A377-A Clip: D7FZ-7F006-A
		13	Adjust idle
	5.0L Under 8500 lbs except CA	1	New PCV valve: D9OZ-6A666-A
		5	New air pump pulley: D5FZ-9B447-D
		6	New air pump drive belt: 40-60 amp alternator: D5PZ-8620-C 70-100 amp alternator: EOPZ-8620-A
		2	Advance timing 4°
cont'd		3	New transmission diaphragm: D8AZ-7A377-A
		13	Adjust idle

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
83	5.8W Under 8500 lbs except CA 5.8 W "NQ" 5.8 M "NA"	9	Reposition choke rod/lever
		2	Advance timing 6°
		1	New PCV valve: D7AZ-6A666-A
		13	Adjust idle
	D2.2KAF D4.9TCG D5.0TCG D5.8TBF	none	
82	1.6L Escort/EXP/LNX	11a	New high speed air bleeds: Primary: 1.85 mm (TBD) Secondary (Man TX): 2.40 mm (TBD) (Auto TX): 2.20 mm (TBD)
		14	To improve cold start and drive away: Install choke index plate and cap Adjust breather angle
	C1.6LVAC C1.6LVAF	11b	New high speed air bleeds: Primary: 1.90 mm (TBD) Secondary: 1.95 mm (TBD)
	C2.3LVAC C2.3LVAF	4	Connect MCU
	C2.3LVBB 2-05A,B Manual 495 2-06A Automatic 495 (non-feedback)	15	Replace primary main metering jet: Jet: D8PZ-9533-E Bowl cover gasket: EOPZ-9560-B
		12	Install T-bleed and filter: EIZE-6C600-AA
		13	Adjust idle
cont'd		3(2-06A) only)	New transmission diaphragm: EIZZ-7A377-A HAD (black dipped end cap)

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
82	3.3L 2-12 T-R 2-12 B-R C3.3VXF C3.3VXC	2	Adjust timing to 12° BTDC
		1	New PCV valve: EV-49 (D8TE-6A666-BA)
		3	New transmission diaphragm: 7A377 Clip: 7F006
	C3.8VXF C3.8VWF Granada, Cougar, T-Bird, XR-7 with C-5 transmission	9	Reposition choke rod/lever
		2	Advance timing 4°
		1	New PCV valve: EV-76 (6A666)
		3	New transmission diaphragm: VXF: 7A377 VWF: D70P-7A377-AA Clip: 7F006 Note: Save the TV rod. It is matched to the case.
		13	Adjust idle
	C3.8VXF C3.8VWF Continental, T-Bird, XR-7 with AOD transmission	9	Reposition choke rod/lever
		16	Disconnect vacuum switch
		2	Advance timing 4°
		1	New PCV valve: EV-76 (6A666)
cont'd		13	Adjust idle. Also reset hi-cam speed.

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
82	C3.8TAF 2-55D 2-56D R00A/N R10A/N	7	New accelerator pump rod: EIPE-9F687-AA
		8	Remove pullover air bleed
		9(2-55D only)	Reposition choke rod/lever
		2	Advance 6°
		3	New transmission diaphragm: D7OP-7A377-AA Clip: D8BP-7F006-AA
		13	Adjust idle
82	C4.2/5.0LVGF 2-18B,C 2-20D 2-21E 2-22S (C5,AOD or SROD trans.)	9	Reposition choke rod/lever
		17	Install vacuum delay valve: D3FZ-12A091-A
		2(C5+SROD)	Advance timing 4°
		18(AOD only)	New vacuum check valve: D9AZ-12A197-A
82	4.2L Under 8500 lbs except CA (light trucks)	1	New PCV valve: EV-49(D8TE-68890-AA)
		5	New air pump pulley: D4ZE-9480-AA
		6	New air pump drive belt: D5UE-8620-JA
		2	Advance timing 4°
		3	New transmission diaphragm: D7OP-7A377-AA Clip: D7EP-F006-AB
cont'd		13	Adjust idle

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
82	4.9L Under 8500 lbs except CA (light trucks)	1	New PVC valve: EV-49(D8TE-6C317-CB)
		2	Advance timing 4°
		3	New transmission diaphragm: D7AP-7A377-AA
		13	Adjust idle
	5.0L Under 8500 lbs except CA (light trucks)	1	New PCV valve: EV-68(D8TE-6B890-BA)
		5	New air pump pulley: D4ZE-DC480-AA
		6	New air pump drive belt: 40-60 amp alternator: D5UE-9620-JA 70-100 amp alternator: EOTE-8620-CA
		2	Advance timing 4°
		3	New transmission diaphragm: D7AP-7A377-AA
		13	Adjust idle
	5.8WL Under 8500 lbs except CA (light trucks)	1	New PCV valve: D7AZ-6A666A
		2	Advance timing 6°
		9	Reposition choke rod/lever
		3	New transmission diaphragm: D7AP-7A377-AA
cont'd		13	Adjust idle

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
82	3.8LVBC	none	
	C4.2/5.0VDF		
	4.2/5.0LVDC		
	4.2/5.0LVCB		
	4.2/5.0TAF 2-53X R00A/N		
	4.2/5.0LTCC		
	4.2/5.0LLDV		
	C4.9TDF		
	4.9TDF 2051Y R00A/N		
	5.0LVEF		
	C5.0VEC		
	5.8WTAF 2-64X R00A/N		
	CFM5.8T2HBF9		
	C5.8LVAF		

continued

FORD (continued)

Year	Engine Family/ Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
81	1.6L 1-03A,C,D 1-04A,C,Q	11a	New high-speed air bleeds: Primary: 1.85 mm (TBD) Secondary (manual): 2.40 mm (TBD) (auto) : 2.40 mm (TBD)
	2.3L AHF (except CA)	15	New primary main jet: D8FZ-9533-E Gasket: EOPZ-9561-B
		12	Insert T-bleed and filter
		13	Adjust idle
	3.3L all	2	Adjust timing to 12° BTDC
		1	New PCV valve: EV-49 (6A666)
		19	New carburetor choke pulldown motor Motor: -9S514- Setting: 0.110 ± 0.02 in.
	4.2/5.0 MAF C4 or AOD transmission	9	Reposition choke rod/level
		17	Install vacuum delay valve: D32E-12A189-AA
		2(C4 only)	Advance timing 4°
		18(AOD only)	New vacuum check valve: D9AE-12A197-AA
	4.2/5.0L NA except CA	1	New PCV valve: D8T2-6A666-B
		2	Advance timing 4°
		3	New transmission diaphragm: D7DZ-7A377-A Clip: D7FZ-7F006-A
cont'd		13	Adjust idle

continued

FORD (continued)

Year	Engine Family Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
81	4.9L NR except CA	1	New PCV valve: D7AZ-6A666-A
		2	Advance timing 4°
		13	Adjust idle
	5.8W NQ 5.8M/6.6L NA	9	Reposition choke rod/lever
		2	Advance timing 6°
		1	New PCV valve: D7AZ-6A666-A
		13	Adjust idle
	4.2/5.0GCC 4.2/5.0NP 4.9NK 5.8W NG	none	
72-74	4-cylinder Passenger car	2	Advance timing 4°
		20	Reset choke specifications: Lean choke setting up to 3 notches from spec
75-80	4-cylinder Passenger car	2 (carb. spark port only)	Advance timing 4°
		13	Adjust idle Also carb fuel/air ratio
		20	Reset choke specifications: Pulldown: 7mm, Cam set: 4mm Lean choke setting up to 3 notches from spec K/D speeds to spec
68-74	6-cylinder Passenger car	2	Advance timing 4°
		13	Also carb fuel/air ratio
cont'd		20	Reset choke specifcations: Lean choke setting up to 3 notches from spec

continued

FORD (continued)

Year	Engine Family Calibration	Applicable Procedures	Replacement Part Number/ Specification/Notes
75-80	6-cylinder Passenger car	2	Advance timing 4°
		13	Adjust idle Also carb fuel/air ratio
68-80	V8 Passenger car	20	Reset choke specifications: Incr.choke pulldown setting 0.020"
68-80	Light duty trucks	2	Advance timing 4°
		13	Adjust idle Also carb fuel/air ratio

PROCEDURE 1: Replace PCV Valve.

- o Remove the existing PCV valve and give it to the customer.
- o Install a new PCV valve of the part number listed.

PROCEDURE 2: Adjust Ignition Timing.

- o Settings given in the table are either final high-altitude specifications or an adnustment (advance or retard(from low-altitude specifications.

PROCEDURE 3: Automatic Only: Replace Transmission Vacuum Diaphragm and Clip.

- o Lift vehicle.
- o Remove the transmission vacuum diaphragm and the attaching bolt, clip, and vacuum hose. The diaphragm does not need to be saved.
- o Install a new diaphragm (and sometimes clip) of the part number(s) listed.
- o Reinstall the attaching clip, bolt and vacuum hose.
- o Torque to specifications. The hose may require shortening or a longer hose may be required.
- o Lower the vehicle.

PROCEDURE 4: Connect MCU.

- o Locate the MCU harness.
- o Locate two unconnected wires extending 4-6 inches from the back of the harness.
  - On Mustang, Capri, Fairmont, and Zephyr, one is green with green stripe, the other black with a green dot.
  - On LTD, Marquis, Granada and Cougar, one is black, the other blue.
- o Gently pull the taped ends out of the bundle.
- o Remove the tapes from the ends.
- o Remove 1/4" insulation from the end of each wire.

continued

FORD continued

PROCEDURE 4 continued

- Splice the wires together and solder securely (not cold solder).
- Wrap the connection with electrical tape.
- Secure the wires to the harness.

PROCEDURE 5: Manual Only: Replace Air Pump Pulley.

- Remove the existing air pump pulley and give it to the customer.
- Install a new pulley of the part number listed.

PROCEDURE 6: Replace Air Pump Drive Belt.

- Remove the existing air pump drive belt and give it to the customer.
- Install a new belt of the part number listed.
- Tension the belt to 120-160 pounds.

PROCEDURE 7: Replace Accelerator Pump Rod.

- Remove the existing accelerator pump rod and give it to the customer.
- Install a new rod of the part number listed.

PROCEDURE 8: Remove Pullover Air Bleed.

- Use a small plug remover or a sheet metal screw to remove the pullover air bleed from the top front of the air horn.

PROCEDURE 9: Reposition Choke Lever.

- Remove the choke plate lever screw.
- Reposition the rod to the altitude hole.
- Reinstall the screw.

continued

PROCEDURE 10: Adjust Carburetor Idle Mix.

- Perform the carburetor idle mix adjustment according to the propane enrichment method in the shop manual. If the propane gain is not 10-30 rpm, reset it to 20 rpm.
- Reinstall the adjustment limiting feature.

PROCEDURE 11a: Replace Primary High Speed Air Bleeds.

- Remove air cleaner assembly and set it aside.
- Remove the air cleaner bail retaining pin by using a pliers with a firm grip to disengage the light pin press.
- Remove the air cleaner bail and stud as an assembly.
- Unscrew the primary and secondary high speed air bleed, main well tube and main jet assembly.
- Using a thin needle nose pliers, carefully lift the assemblies out of the carburetor, distinguishing between primary and secondary air bleeds.
- Take apart by hand the air bleeds, the main well tubes, and the main jets. (They are press fit.)
- Install new primary and secondary high speed air bleeds of the part numbers listed.
- Install both air bleed assemblies into position. Torque to 5.3 lb. in.
- Install the air cleaner bail, stud, and retaining pin.
- Check all idle speeds according to PROCEDURE 13.
- Install the air cleaner assembly.

PROCEDURE 11b: Replace Primary and Secondary High Speed Air Bleeds.

- Remove the air cleaner assembly and set it aside.
- Remove the air cleaner bail retaining pin by using a pliers with a firm grip to disengage the light pin press.
- Remove the air cleaner bail.

continued

FORD continued

PROCEDURE 11b continued

- Unscrew the primary and high speed air bleed, main well tube and main jet assembly. NOTE: This assembly is staked in production and therefore may resist removal. Do not allow any chips to fall into the main well.
- Use a thin needle nose pliers to carefully lift the assembly from the carburetor.
- Take apart by hand the high speed air bleed, main will tube and main jet assembly. (It is press fit.)
- Install a new primary high speed air bleed of the part number listed and reassemble the assembly.
- Apply one drop of Ford Spec ESE-M4G-204-A3 (Loctite 262 or equivalent) on the threads of the assembly.
- Install the assembly into the carburetor. Torque to 17 in. lbs. NOTE: If you have trouble reinstalling the assembly, refer to Technical Letter PTC-2-071-E for an alternative installation procedure.
- Unscrew the secondary high speed air bleed, main well tube and main jet assembly.
- Use a thin needle nose pliers to carefully lift the assembly out of the carburetor.
- Take apart the assembly by hand. (It is press fit.)
- Install a new secondary high-speed air bleed of the part number listed.
- Apply one drop of Ford Spec ESE-M4G-204-A3 (loctite 262 or equivalent) on the threads of the assembly.
- Install the assembly into the carburetor (See note above.) Torque to 17 in. lbs.
- Install the air cleaner bail and the retaining pin.
- Check all idle speeds according to specifications.
- Install the air cleaner assembly.

continued

PROCEDURE 12: Install T-Bleed and Filter Assembly.

- o Remove the PVC tube from the carburetor spacer to the crankcase vent valve.
- o Cut the tube at midlength.
- o Install the T-Bleed and filter assembly of the part number listed.
- o Reinstall the modified PCV tube.
- o Start the engine and check for fuel leaks.

PROCEDURE 13: Adjust Idle Speeds.

AFTER all other modifications have been completed:

- o Check and adjust idle speeds to low-altitude specifications.
- o Whenever the idle speed is increased by more than 100 rpm or decreased, automatic transmission throttle linkage may have to be adjusted.

PROCEDURE 14: Install Choke Index Plate and Cap; Adjust Breather Angle.

- o Remove the air cleaner assembly and set it aside.
- o Remove the thermostatic housing (choke cap part number 24-05-7).
- o Remove the choke index plate.
- o Determine whether the carburetor has a "C" spring.
- o Install a new choke index plate.
  No "C" spring: E1PZ-9A539-H
  "C" spring: E1PZ-9A539-J
- o If the carburetor has a "C" spring, check and adjust the choke breather angle (Note: This is not normally checked. Do not confuse it with choke pulldown, de-choke, or cam set.):
  - Place the throttle on high cam position.
  - Close the choke plates by hand and secure with a small strong rubber band.
  - Manually open the choke plates to overcome the light closing pressure but not to the point where the bimetal lever begins to move.

continued

PROCEDURE 14 continued

- Measure the distance from the downward side of the primary choke plate to the air horn wall (breather angle). Spec is 1.8 mm (#50 drill 0.070 ± 0.001).

- Rotating the index plate clockwise increases breather angle distance, and vice versa. A small amount may have to be removed from the index plate choke housing locking tab.

o Install a new thermostatic housing (choke cap E2PZ-9848-D) and attaching hardware.

NOTE: On all automatic transmission applications, the cold choke delay system must be removed. Attach the main wiring harness choke connection directly to the choke cap and connect the two overlay connections (male-female) together.

o Reinstall the air cleaner assembly.

PROCEDURE 15: Replace Primary Main Metering Jet.

o Remove the air cleaner assembly.

o Remove the fuel line at the filter.

o Remove the bowl vent line.

o Remove the 5 bowl cover screws and washers.

o Carefully lift the bowl cover and disengage the choke rod from the choke lever adjacent to the fast idle cam.

o Invert the bowl cover and set it aside.

o Remove the primary main metering jet (choke side).

o Install a new primary main metering jet of the part number listed.

o Inspect and clean the bowl cover and main body gasket sealing surface.

o Position a new bowl cover gasket of the part number listed on the main body.

o Reinstall the bowl cover by engaging the choke rod into the choke lever.

continued

FORD continued

PROCEDURE 15 continued

- Reinstall the 5 retaining screws and washers. Torque screws to 20 in. lb.
- Reinstall the bowl vent line and fuel line.
- Start the car and check for fuel leaks.

PROCEDURE 16: Disconnect Vacuum Switch.

- Cut the wires between the vacuum switch assembly and the ignition module.
- Solder the wires together to form a jumper at the ignition module. Tape the soldered joint.

PROCEDURE 17: Install Vacuum Delay Valve.

- Install a vacuum delay valve of the part number listed into the hose routed to the thermactor air control valve. (Replace the existing valve if there is one.)
  NOTE: The thermactor air control valve is of a dual diaphragm design. Make sure that the delay valve is installed with its brown side facing the diaphragm that does not have vent holes. (The vent holes have cotton showing through.)

PROCEDURE 18: Install Vacuum Check Valve.

- Install a vacuum check valve of the part number listed into the hose routed to the ignition timing vacuum switch, mounted near the ignition module. Make sure the blue side of the vacuum check valve faces the ignition timing vacuum switch.
- Ensure that all hose connections are secure and that there are no vacuum leaks.

PROCEDURE 19: Replace Carburetor Choke Pulldown Motor.

- Replace the carburetor choke pulldown motor with a new one of the part number listed. Use the procedure in Section 24-09-7 of the 1981 Car Shop Manual.
- Adjust the motor to the listed pulldown setting. Use the procedure in Section 2, 20-02-9 of the above manual.

PROCEDURE 20: Adjust Choke Specifications.

- Reset choke specifications to the values listed.

GENERAL MOTORS

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1984		E1G1.6W2NEA6 E1G1.9T2TBA8 E1G2.0W5XAJX E1G2.8W2NNA4 E4G3.8W2NEY5 E4G4.1W5AGAX E6G4.1W5NKA1 E3G5.0W4NBA2 E1G5.0W4NEAX	none	
1983	Chevrolet Pontiac	D1G1.6V2NEA0 D1G1.6V2NEA5	1	Install Altitude Harness Jumper
	Chevrolet Diesel	D1G1.8D7ZZ90	2	Adjust Full Load Screw
	Chevrolet Truck	D1G1.9T2HEC8 D1G2.0T2HJC9	3	Advance Timing 4°
			4	Adjust Idle
		D1G2.8T2HJC2	3 (MT)	Advance Timing 2°
			4	Adjust Idle to 700rpm MT: Neutral AT: Drive
		D1G4.1T2HHS0 D1G4.1T2HHD2	3	Advance Timing 4°
			5	Adjust Primary Vacuum Break
			4	Adjust Idle (HA)
	Oldsmobile Cutlass Diesel	D3G4.3D7ZZT8 D3G4.3D7ZZK7	6	New EGR Vacuum Control Assembly: 22519396
			7	Remove EGR Trim Control Vacuum Modulator Valve
			8	Adjust Pump Timing -6°
			4	Adjust Idle
			9a	Adjust Metering Valve Stop Screw 2-1/8 Turns Counterclockwise

continued

GENERAL MOTORS continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983 cont'd			3	Advance Timing 4°
			10	Adjust Choke Vacuum Break to 26°
		D1G5.0T4HGH3	4	Adjust Idle Curb: MT: 700rpm, NEUTRAL AT: 600rpm, DRIVE Solenoid: MT: 700rpm, NEUTRAL
	Oldsmobile Diesel	D3G5.7D7ZZT7	6	New EGR Vacuum Control Assembly: 22515542
			8	Adjust Pump Timing -4°
			4	Adjust Idle
			9b	Install Metering Valve Stop Screw Adjust 2-1/2 Turns Counterclockwise Kit #22516487
	Chevrolet/ GMC Truck Diesel	D1G6.2K7ZZ40	11	Have Injection Pump Adjusted
		D2G1.8V5TDGX D1G1.9T2TBA7 D1G2.0W5XAJ9 D2G2.5V5TPG6 D1G2.8T2TRA1 D1G2.8W2NNA3 D4G3.0W2NEA4 D4G3.8W2TMA0 D4G4.1W4AEA3 D6G4.1V5AGA4 D6G4.1W5AGA9 D1G4.1T2TMA9 D1G5.0W4NDA7 D1G5.0W4NEA9 D1G5.0W4TMA1 D3G5.0W4ARA3 D3G5.0W4NBA1 D1G5.7W5NBM8 D1G5.7T4TYA3	none	

continued

GENERAL MOTORS continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1982	Chevette Pontiac	C1G1.6V2TNR1 C1G1.6V2NEAX FED: 4/MT CAL: AT	1	Install Altitude Harness Jumper
		FED & CAL 5/MT	12	Install Service PROM
	Chevrolet Diesel	C1G1.8D7ZZ9X	2	Adjust Fuel Load Screw
	Chevrolet S Truck	C1G1.9T2HEC7	3	Advance Timing 4°
		C1G2.8T2HJC1	4	Adjust Idle
	Chevrolet	C1G3.8V2ACA0	12	Install Service PROM
	Chevrolet Truck	C1G4.1T2HHD1	3	Advance Timing 4°
		C1G4.1T2HHSX	4	Adjust Idle
	Oldsmobile Diesel		6	New EGR Valve Vacuum Control Assembly: 25515542 Adjust to 2.5 in HG ± 0.5
			7	New Vacuum Modulator Valve: 22516009 Adjust to 9 in Hg ± 1
				Adjust Metering Valve Stop Screw 3 Turns Counterclockwise
	Chevrolet	C1G4.4V2ACA6 (w/o closed loop fuel control)	12	Install Service PROM
			3	Advance Timing 4°
			10	Advance Choke Vacuum Break to 26°
		C1G5.0T4HGH2 C1G5.7T4HAC5 C1G5.7T4HHC8	4	Adjust Idle: Curb: MT: 700rpm, NEUTRAL AT: 600rpm, DRIVE Solenoid: MT: 700rpm, NEUTRAL

continued

GENERAL MOTORS continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1982 cont'd	Chevrolet Diesel	C3G5.7D7ZZT6	6	New EGR Vacuum Control Assembly: 88 Wagon, 3/AT: 22515167 All Others: 22515542
			9b	Install Metering Valve Stop Screw Adjust Counterclockwise: 88 Wagon: 3 Turns All Others: 2-1/2 Turns Kit #22516487
	Chevrolet/ GMC Diesel	C1G6.2K7ZZ4X	11	Have Injection Pump Adjusted
		C1G1.6V2NEAX (CAL) C1G1.8V2NNAO C2G1.8V5TDG9 C1G1.9T2XBNO C2G2.5V5TPG5 C1G2.8V2NNA8 C1G2.8T2TRAO C3G4.3V2AEA2 C1G4.4V2ACA6 (w/ closed loop fuel control) C3G5.0V4ARA8 C1G5.7V4ACA7 C1G5.7W4ACA1 C1G5.7V5NBM2 C1G5.7W5NBM7	none	
1981	Chevette Diesel	11B9ZZ	2	Adjust Full Load Screw
	Buick Oldsmobile Pontiac Cadillac	14E2TM 13H2AC 13H2AEJ 12H2AD 12S4ABD 12S4AB 13Y4AR 13Y4ARJ 14E4NBD 14F4AE 14F4AEJ 12X2NN 16T5ADB 16T5ADBJ 16T5ARB	none	

continued

GENERAL MOTORS continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1968-1980	Cadillac Buick Chevrolet GMC Isuzu (Luv) Opel	All FED or CAL gasoline engines except those exempted below	13	Set Choke Coils
			10	Adjust Choke Vacuum Break: Angle Gage: 2° over Spec Plug Gage: 0.015 in over Spec
			3	Advance Timing 4°
			4	Adjust Idle Mixture, Speed NOTE: Adjust idle speed ONLY if carburetor mixture screws are not covered with metal plugs.
				Write in "Procedure A" on Update Label.
	Pontial Oldsmobile	All FED or CAL gasoline engines	13	Set Choke Coils
			10	Adjust Choke Vacuum Break: Angle Gage: 2° over Spec Plug Gage: 0.015 in over spec
			4	Adjust Idle Mixture, Speed NOTE: Adjust idle speed ONLY if carburetor mixture screws are not covered with metal plugs.
				Write in "Procedure B" on Update Label.
1978-1979				Install Metering Valve Stop Screw Adjust Counterclockwise: 5.7L: 1-1/2 Turns 4.3L: AT: 2-7/8 Turns MT: 2-5/8 Turns Kit #22516487 or equivalent

continued

GENERAL MOTORS continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1980	Buick	04E2MCR2 (CAL) 04E4UCD (Turbo) (CAL)	none	
	Cadillac	06T5GY (FED) 06JORC2 (CAL)		
1979	Cadillac	960V0 (FED,CAL) 960J0U (FED) 960J0 (CAL) 960J0UC (CAL)		
1978		860J0U (FED) 860J0 CAL) 860Y0 (CAL)		
1977	Cadillac	760J0U (FED) 760V0 (FED,CAL)		
1976	Cadillac	60V0 (FED) 60J0 (FED) 61V0 (CAL) 61J0 (CAL)		

GENERAL MOTORS

PROCEDURE 1: Install Altitude Harness Jumper.

- Connect the altitude harness jumper wire from circuit #450E at the ALDL connector to pin #18 on the ECM connector. Refer to the chassis service manual for the location and identification of the jumper wire and the pin.

PROCEDURE 2: Adjust Full-Load Screw (Owner Expense).

NOTE: Perform this modification with the engine NOT running.

- Remove the full-load adjusting screw lock wire and seal.
- While holding the adjusting screw to prevent rotation, loosen the lock nut.
- Rotate the screw 90° counterclockwise.
- Retorque the lock not (8-12 n-m) while holding the screw to prevent rotation.
- Install a new lock wire and seal.

PROCEDURE 3: Adjust Timing.

- Adjust the ignition timing as much as that specified as long as a road test at high altitude reveals no audible spark knock. Reference setting is the specification on the Emission Control Information Label.

PROCEDURE 4: Adjust Idle.

- Adjust the idle to the specifications on the Emission Control Information Label or to the specification given.
- (HA) indicates adjustment to the equivalent certified high altitude specification.

PROCEDURE 5: Adjust Primary Vacuum Break.

- Adjust the primary vacuum break to the equivalent certified high altitude specification if required to improve cold start and driveability.

continued

PROCEDURE 6: Replace EGR Vacuum Control Assembly (Owner Expense).

- Remove the existing EGR vacuum control assembly.
- Install a new EGR vacuum control assembly of the part number listed.

PROCEDURE 7: Remove EGR Vacuum Modulator Valve (Owner Expense).

- Remove the EGR trim control vacuum modulator valve if the vehicle is so equipped.

PROCEDURE 8: Set Pump Timing (Owner Expense).

- Install a timing meter.
- Set the pump timing to the specification listed.

PROCEDURE 9a: Adjust Metering Valve Stop Screw (Owner Expense).

- Install a magnetic tachometer probe.
- Run the engine until it is at operating temperature.
- Set the idle to specifications.
- Turn the engine OFF.
- Remove the air crossover assembly.
- Install screen covers part number J-29657.
- Put a shop towel in the full intake manifold valley area under the injection pump head to absorb any fuel leakage.
- Put the transmission in PARK.
- Turn the air conditioner OFF.
- Start the engine.
- Loosen the lock nut on the metering valve stop screw.
- Slowly turn the stop screw clockwise until the idle speed drops about 10 rpm.
- Turn the stop screw counterclockwise the given number of turns.

continued

GENERAL MOTORS continued

PROCEDURE 9a continued

- o Tighten the lock nut.
- o Check for fuel leaks around the stop screw.
- o Remove the towel.
- o Turn the engine off.
- o Remove the magnetic tachometer and the screen covers.
- o Reinstall all parts removed.

PROCEDURE 9b: Adjust Metering Valve Stop Screw (Owner Expense).

NOTE: The kit contains lock nut, seal, metering valve stop screw, and label.

- o Install a magnetic tachometer probe.
- o Run the engine until it is at running temperature.
- o Set the idle to specifications.
- o Turn the engine OFF.
- o Remove the air cleaner and the air crossover assemblies.
- o Install screen covers part number J-26996-2.
- o Put a shop towel in the fuel intake manifold valley area under the injection pump head to absorb fuel leakage.
- o Remove the housing pressure tap plug and seal on the rear of the injection pump.
- o Assemble the lock nut, seal (O-ring) and metering valve stop screw such that the bottom of the lock nut is at the midpoint of the screw (See Figure).
- o Install the assembly in the injection pump until the lock nut contacts the pump housing.
- o Tighten the lock nut.
- o Put the transmission in PARK.

continued

PROCEDURE 9b continued

- o Turn the air conditioner OFF.
- o Start the engine.
- o Loosen the lock nut.
- o Slowly turn the metering valve stop screw clockwise until the idle speed drops about 10 rpm.
- o Turn the stop screw counterclockwise the given number of turns.
- o Tighten the lock nut.
- o Check for fuel leaks around the stop screw.
- o Remove the shop towel.
- o Turn the engine OFF.
- o Remove the timing meter and the screen covers from the intake manifold.
- o Reinstall all parts removed.

PROCEDURE 10: Adjust Choke Vacuum Break.

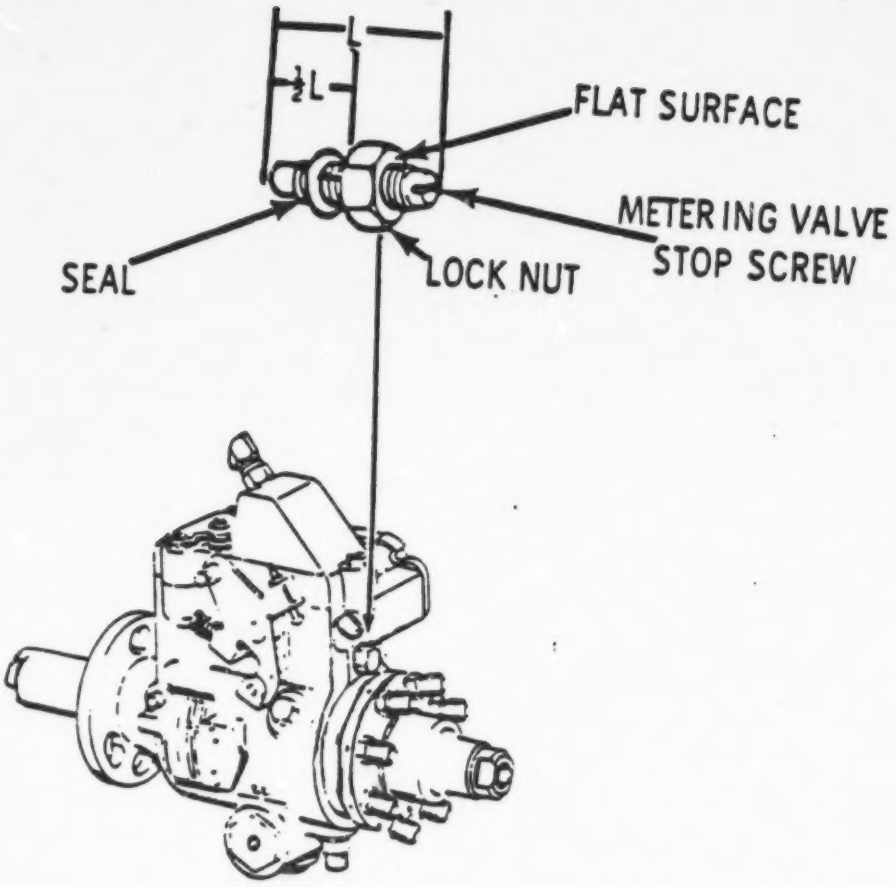
- o Adjust the choke vacuum break to the value listed.

PROCEDURE 11: Have Injection Pump Adjusted.

- o Remove the fuel injection pump.
- o Send the pump to an ADS (Association of Diesel Specialists) Service Center) for adjustment of the fuel flow rate.
- o Reinstall the pump when it is returned from the service center.

PROCEDURE 12: Install Service PROM.

- o Install the service PROM in the ECM. Refer to the proper chassis service manual for the location of the ECM and the installation procedure.



GENERAL MOTORS: PROCEDURE 9b

Metering Valve Stop Screw Adjustment

ISUZU

Year	Model	Engine Family	Procedures	Label Part No.
84	P'Up, Trooper	ESZ119T2AAG1	1,2	8941468110
		ESZ111D6JCD8 ESZ137K6JCD4	none	
83	I-Mark, P'Up	(except Diesel)	1,2	8941212890
		DSZ119T2AAG0 DSZ111V2FGD5	3,2 4,2	
82	I'Mark, P'up	CSZ111V2FDG4 (except Diesel)	4,2 2,1	8942579070
	LUV	(except Diesel)	2,1	14057201
	P'Up	Diesel	none	

ISUZU

PROCEDURE 1: Advance Ignition Timing.

- Advance ignition timing as much as 4^{o} from specifications on Emission Control Information Label as long as a road test reveals no audible spark knock at high altitude.

PROCEDURE 2: Adjust Idle Speed.

- Adjust the idle speed to the specifications on the Emission Control Information Label.

PROCEDURE 3: Connect Delay Valve.

- Connect the delay valve to the vacuum line between the 3-way and air switching valve.

PROCEDURE 4: Install Altitude Switch and Solenoid Valve Assembly.

- Remove the air cleaner from the carburetor.
- Remove the vacuum switch assembly.
- Put the vacuum switch assembly back into place along with the altitude switch and the solenoid valve assembly. Use a common bolt.
- Remove the 3 rubber caps from the altitude compensation air passage on the carburetor.
- Insert the 3 small rubber hoses from the solenoid valve into three passage pipes and hold them with clips.
- Put the air cleaner back on the carburetor.
- Disconnect a large rubber hose from the air cleaner pipe. Connect this hose to one of the 3-way passages and hold it with a clip.
- Connect the harness connector on the altitude switch and solenoid valve assembly to the body harness connector.

MASERATI QUATTROPORTE
1983-1984

PROCEDURE: Reduce Idle CO Setting.

- Reduce idle CO setting from 4.5% to 3.5%.

Year	Model		Engine Family	High Altitude Kit Part Number Unless Otherwise Specified
83	Mazda B2000		DTK2.0T2AHH4 FED	8387-99-041
	Courier			E17Z-9D544-A
	Mazda B2000		DTK2.0T2AJJ5 CAL	8397-99-041
	Courier			E17Z-9D544-B
	Mazda, Courier		DTK2.2K6JKK9	None
81	Courier	FED	BTK2.0T2AE9	E17Z-9D544-A
		CAL	BTK2.0T2AG0	E17Z-9D544-B
	Courier	FED	BTK2.3T2AF3	E17Z-9D544-C
		CAL		E17Z-9D544-D
		Chassis Cab		E17Z-9D544-E
	Mazda B2000	FED	BTK2.0T2AE9	8387-23-521
		CAL	BTK2.0T2AG0	8397-23-521
	RX-7	FED	BTD1.1V4GA7	None
		CAL	BTK1.1V4GH3	
	GLC		BTK1.5V2GB0	
	GLC Wagon		BTK1.5V2GC1	
	626		BTK2.0V2GD6	
70-80			Rotary engines	None
80	Courier 2.0L	FED	OMAT	D97Z-9D544-A
		CAL		D97Z-9D544-B

continued

MAZDA continued

Year	Model			Engine Family	High Altitude Kit Part Number Unless Otherwise Specified
80	Courier 2.3L	FED		OWBT	D77Z-9D544-H
		CAL			D97Z-9D544-C
		Chassis Cab			
	Mazda B2000	FED		OMAT	8678-99-041
		CAL			8682-99-041
	Mazda GLC CAL Wagon w/AT			OUCP	8318-99-041
	Mazda GLC except CAL Wagon w/AT			OUCP	None
79	Courier 2.0L	FED		9MAT	D97Z-9D544-A
		CAL			D97Z-9D544-B
	Courier 2.3L	FED		9WBT	D77Z-9D544-H
		CAL			D97Z-9D544-C
		Chassis Cab			
	Mazda 626			9NAP	8329-99-041
	Mazda B2000	FED		9MAT	8678-99-041
		CAL			8682-99-041
	Mazda GLC	FED		9UCP	8914-99-041
		CAL	MT		3922-99-041
			AT		3961-99-041
78	Courier 1.8L	FED		8FVBT	D77Z-9D544-E
		CAL		8CVBT	D77Z-9D544-F

continued

MAZDA continued

Year	Model			Engine Family	High Altitude Kit Part Number Unless Otherwise Specified
78	Courier 2.3L	FED		8FWBT	D77Z-9D544-G
		CAL		8CVBT	D77Z-9D544-H
	Mazda B1800	FED		8FVBT	3880-99-041
		CAL		8CVBT	3882-99-041
	Mazda GLC	FED		8FTCP	3918-99-041
		CAL	MT	8CTCP	3922-99-041
			AT		3961-99-041
77	Courier 1.8L	FED		FVBT	D77Z-9D544-E
		CAL		CVBT	D77Z-9D544-F
	Courier 2.3L	FED		FWBT	D77Z-9D544-G
		CAL		CWBT	D77Z-9D544-H
	Mazda B1800	FED		FVBT	3880-99-041
		CAL		CVBT	3882-99-041
	Mazda GLC	FED		FTCP	3918-99-041
		CAL	MT	CTCP	3922-99-041
			AT		3961-99-041
	Mazda 808 1.3L	FED		FTCP	3918-99-041
		CAL		CTCP	3922-99-041
	Mazda 808 1.6L	FED	MT	FNA	3608-99-041
			AT		3621-99-041
		CAL		CNAP	3936-99-041

continued

MAZDA continued

Year	Model			Engine Family	High Altitude Kit Part Number Unless Otherwise Specified
76	Courier 1.8L	FED	MT	VBT	D57Z-9D544-B
			AT		D67Z-9D544-B
		CAL		CVBT	
			MT		D67Z-9D544-A

MAZDA

All high altitude adjustments for Mazda and Courier involve replacing the primary and secondary main jets in the carburetor and adjusting the throttle positioner or similar device. Mazda provides for each vehicle a high altitude kit which contains new primary and secondary main jets and usually a new gasket for the carburetor. Part numbers for the high-altitude kits are given in the table.

The Procedure 1 given below is a comprehensive one; any one vehicle may not be equipped with all the items mentioned. Procedure 2 is assumed to involve many of the steps given in Procedure 1, but only this brief description of the procedure was given by the manufacturer.

PROCEDURE 1: Install High-Altitude Kit.

- o Remove the air cleaner and duct assembly.
- o Remove the bolts attaching the accelerator shaft to the throttle lever.
- o Disconnect the fuel line and the fuel return line at the carburetor.
- o Disconnect the lead for the slow fuel cut valve (throttle solenoid) and the deceleration valve at the disconnects.
- o Disconnect the carburetor-to-distributor vacuum line at the carburetor.
- o Disconnect the hose from the carburetor to the vacuum amplifier.
- o Disconnect the vacuum hose for the purge control valve.
- o Disconnect the throttle return spring.
- o Disconnect the lead wire for the automatic choke.
- o Remove the servo diaphragm link for the throttle opener.
- o Using tool T72J-9510, remove the carburetor attaching nuts from the intake manifold studs.
- o Remove the carburetor.
- o Remove the locking plate.
- o Remove the plugs and the main jets from the carburetor.

continued

MAZDA continued

PROCEDURE 1 continued

- o Install new primary and secondary main jets from the kit of the part number listed.
- o Reinstall the plugs.
- o Reinstall the locking plate.
- o Position the carburetor and a new gasket on the intake manifold and reinstall the attaching nuts.
- o Reconnect the throttle return spring.
- o Reconnect the accelerator shaft to the throttle lever and reinstall the attaching nuts.
- o Reconnect the slow fuel cut valve, the automatic choke lead and the deceleration valve at the disconnect.
- o Reconnect the carburetor-to-distributor vacuum line.
- o Reconnect the vacuum line for the purge control valve.
- o Reconnect the fuel line and the tuel return line to the carburetor.
- o Reinstall the air cleaner and the duct assembly.
- o Start the engine and check for fuel leaks.
- o Adjust the throttle positioner system, throttle opener, or dashpot to the rpm specified in the shop manual.

PROCEDURE 2: Install High Altitude Kit.

- o Remove the carburetor.
- o Remove the dust cover.
- o Turn the idle adjust screw clockwise 1/4 turn.
- o Reinstall the dust cover.
- o Install the high altitude kit of the part number listed into the carburetor.
- o Reinstall the carburetor.

MERCEDES

All 1982, 1983, and 1984 models meet high altitude specifications. No modifications are required.

MITSUBISHI

Engine Family	Procedure
50-state	none
CMT2.0T2BCA8	
CMT2.6T2BCA0	
All Others	1

PROCEDURE 1:

- o Unplug the two nipples on the carburetor.
- o Connect the HAC unit to these nipples with vacuum hose.
- o Replace the plug in the jet air passage with a shorter plug which will allow additional air to enter.
- o (Automatic Transmission Only) Replace the vacuum hose to the diaphragm chamber with a vacuum delay valve assembly.

PEUGEOT

Year	Engine Family	Procedures
1981	XN6	none
	XD2S	none
	XD2C	1,2

PROCEDURE 1: Adjust Injection Pump Timing.

- Adjust the injection pump timing to $13^{o} \pm 1$ BTDC. Use the adjustment procedure on pages F4032-F4034 of the workshop manual.

PROCEDURE 2: Modify EGR System.

- Delete the vacuum at the EGR metering device:
  - Disconnect the wire n^{o} 84.
  - Disconnect the metering device at the electrovalve.

ROLLS ROYCE (BENTLEY)

The following engines meet high altitude specifications.
No modifications are required.

Year	Engine Family
84	ERR412 V6 FAA0
83	DRR412 V6 FAAX
81	BRR412 V6 FA4

SAAB

All 1968-1984 models meet high altitude specifications.
No modifications are required.

SUBARU

Year	Engine Family	Procedures
82-83	DFJ1.8T2AFD2	?
	All Others	None
81	All	None

YEAR	MODEL	ENGINE TYPE	ENGINE FAMILY	HAC KIT PART #	REPLACEMENT JET PART #	IGNITION TIMING	UPDATE LABEL
84	Truck	22R	ETY2.4T2AFF0 w/o HAC	04215 - 35080	(HAC Valve: 25709 - 39010)	5° BTDC	11282 - 35020
	Truck	22R	ETY2.4T2EBB0 w/o HAC	04214 - 35060	90999 - 41103	9° BTDC	11282 - 35030
		All other 84 engines need no modification for high altitude use.					
83	Truck Celica		DTY2.4T2AFFX DTY2.4V2EBB9 w/o HAC				11282 - 13040
	Truck	22R	DTY2.4T2EBBX w/o HAC	04214 - 35050	90999 - 41120	9° BTDC	11282 - 15010
	Truck	Diesel	DTY2.4K6JFF9	none	none	Injection timing: 0.044 inch plunger lift at TDC	11282 - 54030
	All other 83 engines need no modification for high altitude use.						
82	Starlet	4K-C	CTY1.3V2ACC7		90999 - 41103	16° BTDC	11282 - 13030
	Corolla Tercel	3A-C	CTY1.5V2ECC9		90999 - 41104	9° BTDC	11282 - 15010
	Corolla	3T-C	CTY1.8V2FCC8		5/MT 90999 - 41104 4/MT AT 90999 - 41102	11° BTDC	11282 - 28010
	Truck Celica	22R	CTY2.4T2EBB9 w/o HAC CTY2.4V2ECC0		90999 - 41110	12° BTDC	11282 - 13020
	Starlet		CTY1.3V2AFF5 w/o HAC	Install HAC valve			
	Corolla		CTY1.5V2AFF6 w/o HAC				
	Corolla		CTY1.8V2NFF1 w/o HAC				
	Celica Corona		CTY2.4V2EFF9 w/o HAC				
	Truck		CTY2.4T2AFF9 w/o HAC				
	Truck	Diesel	CTY2.2K6JFF8 Before 82-r-9	Install injection nozzle #23620 - 54030 Adjust opening pressure to 1,778 - 1920 psi with shims 0.0039 inch thicker than original.		Injection timing: 0.046 inch plunger lift at TDC	11282 - 54020
	Truck	Diesel	CTY2.2K6JFF8 After 82-r-9			Injection timing: 0.044 inch plunger lift at TDC	11282 - 54010
	All other 82 engines need no modification for high altitude use.						

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	ENGINE FAMILY	HAC KIT PART #	IGNITION TIMING
81	Starlet	4K-C	BTY1.3V2AF8 w/HAC W/O HAC	04214 - 13010 04214 - 13020	8° BTDC 12° BTDC
			BTY1.3VAC5	04214 - 13030	12° BTDC
	Corolla Tercel	3A-C	BTY1.5V2AF7 w/o HAC	5/MT, 3/AT: 04214 - 15010 4/MT: 04214 - 15020	9° BTDC
			BTY1.5V2EC1	04214 - 15030	9° BTDC
	Corolla	3T-C	BTY1.8V2HF3 w/o HAC BTY1.8V2FC7	5/MT, 3/AT: 04214 - 28010 4/MT: 04214 - 28020	11° BTDC
	Corona/ Celica	22R	BTY2.4V2EF6 w/o HAC BTY2.4V2EC3	04214 - 35010	12° BTDC
	Truck	22R	BTY2.4T2AF1 w/o HAC	2WD: 04214 - 35020 4WD: 04214 - 35030	12° BTDC
			BTY2.4T2EM7 w/o HAC	04214 - 35040	12° BTDC
All other 81 engines need no modication for high altitude use.					

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	REPLACEMENT JET PART #		IGNITION TIMING
80	Corolla Tercel	1A-C	FED 5/MT 3/AT	90999 - 41100	9° BTDC
			4/MT	90999 - 41096	
			CAL	90999 - 41102	
	Corolla	3T-C	FED	90999 - 41109	14° BTDC
			CAL	90999 - 41113	
	Celica Corona	20R	FED 5/MT 3/AT	90999 - 41121	12° BTDC
			4/MT	90999 - 41117	
			CAL	90999 - 41123	
	Truck	20R	FED MT	90999 - 41119	12° BTDC
			AT	90999 - 41117	
			CAL	90999 - 41121	
	Land Cruiser	2F	FED	90999 - 41160	
			CAL	9G999 - 41163	
79	Corolla	3K-C		90999 - 41113	w/o HAC 16° BTDC
					w/HAC 8° BTDC (Sub-diaphragm off)
	Corolla	2T-C	FED	90999 - 41108	FED 14° BTDC
					CAL w/o HAC 18° BTDC
					CAL w/HAC 10° BTDC (Sub-diaphragm off)
	Celica Corona	20R	FED CAL MT	90999 - 41123	12° BTDC
			CAL AT	90999 - 41121	
	Cressida	4M	FED	90999 - 41110	FED 14° BTDC
					CAL 12° BTDC
	Truck	20R	FED	90999 - 41119	12° BTDC
			CAL	90999 - 41121	

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	REPLACEMENT JET PART #			IGNITION TIMING	
79	Land Cruiser		FED		90999 - 41160		
			CAL		90999 - 41163		
78	Corolla	3K-C	90999 - 41112			12° BTDC	
	Corolla	2T-C	FED		90999 - 41110	14° BTDC	
			CAL		90999 - 41111		
	Corona	20R	FED		90999 - 41115	12° BTDC	
			CAL	MT	90999 - 41123		
				AT	90999 - 41121		
	Celica	209	FED	MT	90999 - 41117	12° BTDC	
				AT	90999 - 41115		
			CAL	MT	90999 - 41123		
				AT	90999 - 41121		
	Cressida	4M	90999 - 41110			14° BTDC	
	Truck	20R	FED	MT	41115	12° BTDC	
				AT	41113		
			CAL	MT	41123		
				AT	41121		
	Land Cruiser	2F	FED		90999 - 41123	11° BTDC	
			CAL		90999 - 41122		
77	Corolla	3K-C	90999 - 41113			12° BTDC	
	Corolla	2T-C	FED	MT	90999 - 41106	FED	14° BTDC
				AT	90999 - 41104	CAL	14° BTDC (sub diaphram off)
			CAL		90999 - 41111		
	Corona Celica Truck	20R	FED	MT	90999 - 41117	Corona Celica	12° BTDC
				AT	90999 - 41115		
			CAL	MT	90999 - 41123	Truck	12° BTDC (sub diaphram off)
				AT	90999 - 41121		
	Land Cruiser	2F	90999 - 41134			11° BTDC	

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	REPLACEMENT JET PART #			IGNITION TIMING
76	Corolla	2T-C	FED	MT	90999 - 41105	14° BTDC
				AT	90999 - 41102	
			CAL		90999 - 41108	
	Corona Celica Truck	20R	FED	AT	90999 - 41117	12° BTDC
				MT	90999 - 41119	
			CAL	AT		
				MT	90999 - 41123	
	Corona	4M	90999 - 41104			FED 14° BTDC CAL 9° BTDC
	Land Cruiser	2F	FED		90999 - 41142	11° BTDC
			CAL		90999 - 41122	
75	Corolla	2T-C	FED	MT	90999 - 41105	Single Pt. 14° BTDC
				AT	90999 - 41102	Dual Main 16° BTDC
			CAL		90999 - 41108	Dual Sub 23-29° BTDC
	Corona Celica Truck	20F	FED	AT	90999 - 41117	12° BTDC
				MT	90999 - 41119	
			CAL	AT	(May-Aug 76: 90999 - 41123)	
				MT	90999 - 41123	
	Corona	4M	90999 - 41104			FED 14° BTDC CAL 9° BTDC
	Land Cruiser	2F	FED		90999 - 41142	11° BTDC
			CAL		90999 - 41118	
74	Corolla	3K-C	90999 - 41180			9° BTDC
	Corolla	2T-C	FED		90999 - 41106	FED 9° BTDC CAL 14° BTDC
			CAL		90999 - 41108	
	Corona Corona Truck	18R-C	90999 - 41114			11° BTDC
	Corona Corona	4M	FED		90999 - 41106	9° BTDC
			CAL		90999 - 41104	

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	REPLACEMENT JET PART #		IGNITION TIMING	
74	Land Cruiser		FED	90999 - 41118	11° BTDC	
			CAL	90999 - 41116		
73	Corolla	3K-C		90999 - 41108	9° BTDC	
	Corolla Carina	2T-C	before 4/73	90999 - 41105	9° BTDC	
			after 4/73	90999 - 41106		
	Corona Corona Celica Truck	18R-C		90999 - 41114	11° BTDC	
	Corona Crown	4M		90999 - 41106	9° BTDC	
	Land Cruiser	F		90999 - 41118	11° BTDC	
72	Corolla	3K-C		90999 - 41108	9° BTDC	
	Corolla Carina	2T-C		90999 - 41105	9° BTDC	
	Corona Celica Truck	18RC		90999 - 41114	11° BTDC	
	Corona	2M		90999 - 41116	11° BTDC	
	Land Cruiser	F		90999 - 41116	11° BTDC	
71	Corolla	3K-C		90999 - 41106	1° ATDC	
	Corolla	2T-C		90999 - 41113	9° BTDC	
	Corona Celica Truck	8R-C	after 12/70	90999 - 41124	Fed	4° BTDC
					Cal	14° BTDC
	Crown	2M			4° BTDC	

continued

TOYOTA (continued)

YEAR	MODEL	ENGINE TYPE	REPLACEMENT JET PART #		IGNITION TIMING	
71	Crown	4M	MT	90999 - 41098 90999 - 41106 90999 - 41103	4° BTDC	
			AT	90999 - 41101		
	Land Cruiser	F			11° BTDC	
70	Corolla	3K-C	90999 - 41106		1° ATDC	
	Corona Truck	3R-C			9° BTDC	
	Corona	8R-C			4° BTDC	
	Crown	2M			4° BTDC	
	Land Cruiser	F			11° BTDC	
69	Corolla	KC			1° ATDC	
	Corona Truck	3R-C			9° BTDC	
	Corona	8R-C			AI - MT	4° BTDC
					AI - AT	9° BTDC
					EM	9° BTDC
	Crown	2M			9° BTDC	
	Land Cruiser	F			4° BTDC	
68	Corolla	KC			1° ATDC	
	Corona	3R-C			9° BTDC	
	Crown	2M			9° BTDC	
	Land Cruiser	F			4° BTDC	

TOYOTA

Most high altitude modifications for 1968-1984 light-duty Toyota vehicles and trucks involve some combination of the following:

- Installation of a high altitude compensation (HAC) kit which usually consists mainly of a larger diameter primary main jet for the carburetor and gaskets for the air horn, main passage plug, and the main jet,
- Adjustment of the ignition timing, and
- Adjustment of idle rpm, fast idle rpm and throttle positioner rpm to low-altitude specifications.

Specific installation instructions are given with each HAC kit. Additional instructions are given in the Emission Control Repair Manual. Part numbers for the HAC kit, and/or its components, and the specifications for the timing adjustments are given in the table. A set of general instructions, applicable in most cases, is given on the next page.

TOYOTA continued

GENERAL PROCEDURE for most kits:

- o Remove the air cleaner assembly.
- o Remove the carburetor assembly.
- o Remove the air horn assembly from the carburetor.
- o Remove the passage plug and the primary main jet.
- o Install a new primary main jet with a new gasket.
- o Reinstall the passage plug with a new gasket.
- o Reinstall the air horn subassembly with a new gasket.
- o Reinstall the modified carburetor assembly.
- o Reinstall the air cleaner assembly.
- o Warm up the engine to operating temperature.
- o Adjust the ignition timing at max 950 rpm with the distribution vacuum advance OFF.
- o Adjust the idle rpm.
- o Adjust the throttle positioner rpm.
- o Adjust the fast idle rpm with both the EGR system AND the choke opener system OFF.

Year	Model	Engine Family	Idle rpm	% CO	Other Modifications
1982	Pickup	CVW1.7T6APT3	925 ± 75	1.2 ± 0.2	
1981	VW	BVW1.7TçAA7 BVW1.7VçFF6 BVW1.7V6FC8	no change	no change	
	Audi	BAD1.7V6FF0 BAD2.2V6FF4 BAD2.2V6FC1 BAD2.2V6FX5 BAD2.2V6FY6			
1980	Rabbit		900 ± 50	1.0 ± 0.5	
1977	Rabbit		925 ± 75	1.5 ± 0.7	Activate High Compensation Jets
1975-1976	Rabbit		850 ± 50	1.0 ± 0.5	
1975-1976	Scirocco				
1975	Dasher				
1974	Dasher Audi Fox		MT: 850 ± 50 AT: 900 ± 50	1.0 ± 0.5	
	VW Wagon		MT: 800 ± 50 AT: 900 ± 50		
1973	Audi 80		950	0.8-1.0	Adjust Timing to TDC Set notches on Choke Cover & Adjuster Ring 5 mm Leaner from Large Tooth
1972-1973	VW Wagon		MT: 800 ± 50 AT: 900 ± 50	1.0 ± 0.5	

continued

VOLKSGAGEN/AUDI continued

Year	Model	Engine Family	Idle rpm	% Co	Other Modifications
1971-1974	Convertible Sedan Ghia Thing		MT: 900 ± 50 AT: 800 ± 50	2.0 ± 0.5	
1970-1974	Audi 100		925 + 75	0.8-1.0	Adjust Timing to 5° BTDC Set Notch on Housing 5 mm Leaner from Large Tooth
1970-1972	Audi 90		950	0.8-1.0	Adjust Timing to 21° BTDC @ 3000 rpm Set Notch on Housing 5 mm Leaner from Large Tooth
1968-1971	VW Wagon		800 ± 50	2.0 ± 0.5	
1968-1970	Convertible Sedan Ghia Thing		850 ± 50	2.0 ± 0.5	

VOLVO

Year	Engine Family	Procedure
83	DVV174V6FCG7	1,2
68-82	Carbureted	3
	Fuel-injected	3
	B28F (81-82)	3,1
	Diesel	2

PROCEDURE 1: Disconnect Full Load Enrichment System.

- o Disconnect the ground connection (black wire) from the microswitch for full load indication.
- o Insulate the connector with electrical tape or the equivalent and secure it to the wiring harness.

PROCEDURE 2: Adjust Injection Pump.

- o Advance the injection pump timing by 1.5^{o} for each 1000 meters increase in altitude. This corresponds to an increased -value of 0.07 mm distributor plunger stroke @ TDC.
- o Turn the fueling screw counterclockwise 35^{o} for each 1000 meters increase in altitude. This reduces fueling by 2.3 mm^3 per stroke per 1000 meters.

PROCEDURE 3: Adjust Idles.

- o At altitude, adjust idle-CO and idle speed to low altitude specifications.
- o If a carbureted engine cannot meet the specifications, the fuel metering needle and/or the jet may need replacing.

BLUEBIRD HEAVY DUTY TRUCK

1974-1984 427 c.i.d. engine

PROCEDURE 1: Advance Ignition Timing.

- o Advance the ignition timing as much as 4^{o} from specifications on the Emission Control Information Label as long as road tests at altitude reveal no audible spark knock at high altitude.

PROCEDURE 2: Adjust Idle.

- o Adjust the idle speed to the specifications shown on the Emission Control Information Label.

Attach supplemental Emission Control Information Label, PN 102235.

CATERPILLAR HEAVY DUTY TRUCK

Year	Engine Family	Procedure
All	DCT0636DAA5 ECT0636DAA4 DCT0636DCA9 ECT0636DCA8	Make adjustments according to the following charts.

CATERPILLAR HEAVY DUTY TRUCKS
FUEL SETTING INFORMATION

3208 210 HP DINA TRUCK ENGINE SETTINGS 32Y8309-UP Family DCT0636DAA5
Family DCT0636DCA9 Displacement 636 Cu. In.

FULL LOAD RPM	BARE ENGINE HORSE-POWER	EPA OR EPA/CARB CERT.	EFFECTIVE SERIAL NUMBER RANGE		HIGH IDLE RPM BARE ENG	(A) FUEL SETTING (mm)	A/F RATIO CONTROL SETTING	GOVERNOR GROUP NUMBER	SPRING NUMBER	TORQUE CONTROL GROUP	MAX. ALTI-TUDE (FT.)	TURBO CHARGER ASSEM.	MANIFOLD PRESSURE FULL LOAD kPa/In.Hg	BSFC	TYPE OF SERVICE
	1979 RATINGS:	32Y8309-32Y35746									1979 RATINGS				
2800	210	EPA	32Y8309-35746		3030	3.18	None	9N3757	9L6508	6N509	2500-L	None	None	.409	210 HP
2800	200	EPA	"	"	3015	2.80	"	"	"	"	4000-L	"	"	.404	ALT. DERATED
2800	194	EPA	"	"	3000	2.62	"	"	"	"	5000-L	"	"	.395	ALT. DERATED
2600	185	EPA	"	"	2830	2.64	"	"	"	"	2500-L	"	"	.380	185 HP Intercity
2800	200	EPA/CARB	32Y8309-35746		3020	2.90	None	9N5178	9L6508	6N509	2500-L	None	None	.408	EPA/CARB.
	1980 RATINGS:	32Y35747-32Y72175									1980 RATINGS				
2800	210	EPA	32Y35747-72175		3070	3.25	None	9N3757	9L6508	6N509	2500-L	None	None	.414	EPA-TRUCK
2800	200	EPA	"	"	3015	2.87	"	"	"	"	4000-L	"	"	.408	ALT. DERATED
2800	194	EPA	"	"	3000	2.62	"	"	"	"	5000-L	"	"	.395	ALT. DERATED
2600	185	EPA	"	"	2880	2.64	"	"	"	"	2500-L	"	"	.391	185 HP Intercity
2800	200	EPA/CARB	"	"	3050	2.90	None	9N5178	9L6508	"	2500-L	"	"	.418	EPA/CARB.
	1981 RATINGS:	32Y72176-92706									1981 RATINGS				
2800	210	EPA	32Y72176		3050	3.25	None	9N3757	9L6508	6N509-01	2500-L	None	None	.414	TRUCK
2800	210	EPA	32Y20407-UP		3025	3.18	"	"	"	"	2500-L	"	"	.391	TRUCK
2800	200	EPA	"		3015	2.80	"	"	"	"	4000-L	"	"	.390	ALT. DERATED
2800	200	EPA/CARB	"		3025	2.90	"	9N5178	"	"	2500-L	"	"	.398	EPA/CARB.
2800	194	EPA	"		3000	2.62	"	9N3757	"	"	5000-L	"	"	.381	ALT. DERATED
2600	185	EPA	"		3005	2.58	"	"	"	"	5500-L	"	"	.394	185 HP INTERCITY
	1982, 1983 RATINGS:	32Y92707-UP, 5121-UP									1982 1983 RATINGS				
2800	210	EPA	32Y92707-UP		3025	3.18	None	9N3757	9L6508	6N509-01	2500-L	None	None	.391	TRUCK
2800	200	EPA	"		3015	2.80	"	"	"	"	4000-L	"	"	.390	ALT. DERATED
2800	200	EPA/CARB	"		3025	2.90	"	9N5178	"	"	2500-L	"	"	.398	EPA/CARB.
2800	194	EPA	"		3000	2.62	"	9N3757	"	"	5000-L	"	"	.381	ALT. DERATED
2600	185	EPA	"		3005	2.58	"	"	"	"	5500-L	"	"	.394	185 HP INTERCITY

SPECIFIC NOTES

Governor Spring Color Code:
9L6508: 1 Yellow Stripe.
Low idle is 650 RPM.
Fuel injection timing is 16° BTC; 0.127 inch of piston travel.

(A) Fuel setting can be measured with or without fuel pressure.

*with EGR

Variable timing advance is 5° for engines rated for EPA ratings
Variable timing advance is 3° for engines rated for EPA/CARB ratings.

GENERAL NOTES

Additional loads (fan, pumps, compressor, alternator, etc.) will cause the High Idle RPM to be 15-20 RPM less than shown. If this difference is more than 50 RPM, contact the OEM for the correct setting.
Manifold Pressures are measured with muffler and air cleaner installed. If both items are removed, add 3 inches to value shown
L - Lug Condition

CATERPILLAR HEAVY DUTY TRUCKS
FUEL SETTING INFORMATION

320d 175 HP DINA TRUCK ENGINE SETTINGS 40S1-UP; 32Y1-UP Family DCT0636DAA5
Family DCT0636DCA9 Displacement 636 Cu. In.

FULL LOAD RPM	BARE ENGINE HORSE-POWER	EPA OR EPA/CARB CERT.	EFFECTIVE SERIAL NUMBER RANGE	HIGH IDLE RPM BARE ENG	(A) FUEL SETTING (mm)	A/F RATIO CONTROL SETTING	GOVERNOR GROUP NUMBER	GOVERNOR SPRING NUMBER	TORQUE CONTROL GROUP	MAX. ALTI-TUDE (FT.)	TURBO CHARGER ASSEM.	MANIFOLD PRESSURE FULL LOAD kPa/In.Hg		BSFC	TYPE OF SERVICE
1981 RATINGS: 32Y72176-32Y92706											1981 RATINGS				
2600	160	EPA	32Y72176-92706	2800	1.95	None	9N5139	9L6508	6N509-01	7,500-L	None	--	--	.408	
2600	165	EPA	" "	2825	2.18	"	"	"	"	"	"	--	--	.390	
2600	185	EPA	" "	2855	2.64	"	9N3757	"	"	2,500-L	"	--	--	.381	
2800	160	EPA	" "	2940	2.00	"	9N5139	"	"	7,500-L	"	--	--	.400	
2800	175	EPA	" "	2985	2.30	"	"	"	"	7,500-L	"	--	--	.405	
2800	175	EPA/CARB	" "	2995	2.30	"	9N5178	"	EGR	7,500-L	"	--	--	.399	Alt. Derated
1982, 1983 RATINGS: 32Y92707-UP, 5IZ1-UP											1982, 1983 RATINGS				
2600	160	EPA	32Y92707-UP	2825	1.95	None	9N5139	9L6508	6N509-01	7,500-L	None	--	--	.408	
2600	165	EPA	"	2815	2.18	"	"	"	"	7,500-L	"	--	--	.390	
2600	185	EPA	"	2855	2.64	"	9N3757	"	"	2,500-L	"	--	--	.381	
2800	160	EPA	"	2940	2.00	"	9N5139	"	"	7,500-L	"	--	--	.400	
2800	175	EPA	"	2985	2.30	"	"	"	"	7,500-L	"	--	--	.405	
2800	175	EPA/CARB	"	2995	2.30	"	9N5178	"	EGR	7,500-L	"	--	--	.399	Alt. Derated

Governor Spring Color Code:
9L6508 - 1 Yellow Stripe.
Low Idle is 650 RPM.
Fuel injection timing is 16.0° BTC;
0.127 inch of piston travel.
Variable Timing Advance is 3° BTC.

(A) Fuel setting can be measured with or without fuel pressure.

NOTES

Fans, pumps, alternator, etc., will cause the High Idle RPM to be 15-20 RPM less than shown. If this difference is more than 50 RPM, contact the OEM for the correct setting.
L = Lug Condition.

CHRYSLER HEAVY DUTY TRUCKS

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1983-1984		FED 318	1	Adjust Timing to 12°BTDC.
			2	Relieve Tension on Secondary Air Valve Spring.
			3	Adjust Secondary Air Valve Opening to 1/2 Inch.
		FED 360	1	Adjust Timing to 8°BTDC.
			2	Relieve Tension on Secondary Air Valve Spring.
			3	Adjust Secondary Air Valve Opening to 1/2 Inch.
			4	Replace Secondary Metering Jets: 120-5116
1982		FED 318 360	1	Adjust Timing: 318: 12°BTDC 360: 8°BTDC
			2	Relieve Tension on Secondary Air Valve Spring.
			3	Adjust Secondary Air Valve Opening to 1/2 Inch.
			4	Replace Secondary Metering Jets: 4293720
			5	Adjust Propane, Curb, & Fast Idles to Specifications.
1981	"U" or "T" in 8th position of VIN	360-4V	6	Install Driveability Package: 4240180
			1	Adjust Timing.
			5	Adjust Curb & Hot Fast Idles

continued

CHRYSLER HDT continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
1979-1980			1	Adjust Timing.
			5	Adjust Curb Idle, Idle Mixture, & Fast Idle.
			7 (Carter TQ 4-bbl only)	Turn Metering Rod Adjustment Screw 1 1/2 Turns Counter-clockwise.
			8 (If plugs foul or if loading on cold start)	Increase Vacuum Kick Setting 0.020 to 0.040 Inch From Original.

1970-80 CHRYSLER HEAVY DUTY TRUCKS

BASIC TIMING SETTINGS - FEDERAL

MODEL YEAR (TIMING IN DEGREES)

ENGINE	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
225-1	10B	10B	10B	10B	7.5B	10B	10B	10B	10B		
225-2	10B	10B	10B	10B							
318-1	12B	12B	10B	12B	7.5B	8B	8B	8B	8B		12B
318-3	12B	12B	12B	12B	12B	10B	10B	10B			
318-3A					10B						
318-3B					10B						
318-3C					10B						
360-1			10B	10B	10B	10B	10B	10B	12B	12B	12B
360-3			10B	10B	10B	10B	10B	10B	10B	12B	12B
361-2	12B	12B	12B	12B							
361-3	12B	12B	12B	12B	12B						
361-4	12B	12B	12B	12B	12B	12B	12B	12B			
383 Auto Trans	12B	12B									
383 Man Trans	10B	10B									
400			12B	12B	12B		12B	12B	12B		
413-1	12B	12B	12B	12B							
413-2	12B	12B	12B	12B	12B						
413-3	12B	12B	12B	12B	12B	12B	12B	12B			
413-3A								10B			
440-1				12B	12B	12B	12B	12B	12B	12B	
440-3				12B	12B	12B	12B	12B	12B	12B	

1970-80 CHRYSLER HEAVY DUTY TRUCKS

BASIC TIMING SETTINGS - CALIFORNIA

MODEL YEAR (TIMING IN DEGREES)

ENGINE	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
225-1	10B	10B	10B	7.5B	7.5B	10B	10B				
225-2	10B	10B	10B								
318-1	12B	12B	10B	10B	7.5B	10B	10B	10B			12B
318-3	12B	12B	12B	12B	12B	12B	12B				
318-3A					10B						
318-3B					10B						
318-3C					10B						
360-1			10B	10B	10B	12B	12B	10B	10B	12B	12B
360-3			10B	10B	10B	10B	10B	10B	10B	12B	12B
360-2	12B	12B	12B								
361-3	12B	12B	12B	12B	12B						
361-4	12B	12B	12B		12B						
383 Auto Trans	12B	12B									
383 Man Trans	10B	10B									
400			12B	12B	12B						
413-1	12B	12B	12B	12B							
413-2	12B	12B	12B	12B	12B						
413-3	12B	12B	12B		12B						
440-1				12B	12B	12B	12B	12B	12B	12B	
440-3											

PROCEDURE 1: Adjust Timing.

- o Adjust timing to the given specifications. Specifications for 1970-1980 vehicles are given in the following tables. Use low-altitude specifications for 1981 vehicles.

PROCEDURE 2: Relieve Tension on Secondary Air Valve Spring.

- o Relieve the tension on the secondary air valve spring by one turn clockwise.

PROCEDURE 3: Adjust the Secondary Air Valve Opening.

- o Adjust the Secondary Air Valve Opening to 1/2 inch.

PROCEDURE 4: Replace Secondary Metering Jets.

- o Remove the existing secondary metering jets and give them to the owner.
- o Install new jets of the part number listed.

PROCEDURE 5: Adjust Idle.

- o Adjust the given idle speeds &/or mixtures to the original low-altitude specifications or to the given specifications.

PROCEDURE 6: Install Driveability Package.

- o Install new carburetor, EGR amplifier, and EGR valve from the package.
- o Drain about one gallon of coolant from the radiator.
- o Cut the top radiator hose, from radiator end, 4 inches for vans and wagons and 3.5 inches for pick-ups and sport utilities.
- o Remove a 1-inch section from the hose coming from the engine where the cut was just made.
- o Place the two hose clamps over the open ends of the radiator hose.

continued

CHRYSLER continued

PROCEDURE 6 continued--

- o Install the adaptor, PN 3751777, in the top radiator hose. Secure the adaptor using the hose clamps previously installed on the hose ends.
- o Use the sealer, PN 1070876, on the threads of the CCEVS and install the CCEVS in the adaptor, orienting the nipples toward the distributor.
- o Replace the coolant previously drained.
- o For vehicles Not equipped with a TIDC (Thermostatic Ignition Distributor Control) valve, remove the vacuum spark advance hose from the distributor to the generator to the carburetor.
- o For vehicles equipped with a TIDC valve, remove the vacuum hose harness and three lines that connect the TIDC valve to the distributor, manifold vacuum tree and carburetor.
- o Install the CCEVS vacuum hose harness moulded three-way connector on the CCEVS valve.
  - Connect the yellow striped hose to the manifold vacuum tree.
  - Connect the red striped hose to the distributor.
  - Connect the solid black hose to the vacuum spark advance nipple on the left front of the carburetor base.
  - Tie the three hoses to the lower portion of the upper radiator hose using the strap supplied in the package.

INTERNATIONAL HARVESTER

HEAVY DUTY TRUCKS

1968 - 1974 Scout, Travelall

1979 - 1980 Pickup

900 - 1100 Pickup

Metro 800A, 1100A

Follow the procedures on the accompanying chart

INTERNATIONAL HARVESTER HEAVY DUTY TRUCKS

1. PERFORM FOLLOWING ITEMS BEFORE TUNE UP

a. Inspect all vacuum hoses of emission system.
b. Check air cleaner element.
c. Check PCV valve.
d. Clean flame arrestor.
e. Check heat riser valve for freeness.
f. Check vapor storage canister filter.
g. Inspect modulated air cleaner.
h. Check drive belt tension.
i. Check breaker points and condensor (Conv. Ign.).
j. Lubricate breaker cam (Conv. Ign.).
k. Inspect distributor cap and rotor.
l. Torque carburetor mounting bolts.
m. Torque manifold bolts.
n. Check spark plugs.

ENGINE	YEAR	GAP
4-152, 4-196	1968-72	.030"
	79-80	.035"
BG-220, 241, 265	1968	.033"
V-266, 304, 345, 392	1968-74	.030"
	79-80	.035"
6-232	1969-72	.033"
6-258, V-400	1972-74	.035"

o. Check and record cylinder compression.

1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	-

2. HOOK UP INSTRUMENTATION

Scope, Timing light, Vacuum gauge, Tachometer and Dwell gauge

Per Mfg. Recommendation

3. ENGINE WARM UP

a. Set Choke at Fast Idle Position _____
b. Run Engine for 5 Minutes _____

4. EGR FUNCTIONAL TEST

CONDITIONS: High Idle Pos.

a. Record RPM W/O EGR _____ (Temporarily Pinch or Plug Vacuum Hose)
b. Record RPM W/EGR Functioning _____
c. RPM Difference _____

NOTE: No RPM Drop - Repair EGR System per Service Procedure.

5. AIR PUMP FUNCTIONAL TEST

a. Disconnect hose(s) from air pump.
b. Run engine at fast idle.
c. Check for discharge of air from air pump.

NOTE: No Air - Repair Air Injection System per Service Procedure.

6. IGNITION SYSTEM TESTS

TEST:	SPEC.
a. Cranking Coil Output	20-23 KV
b. Coil Output at 2500 RPM	20 KV Min.
c. Spark Plug Var. Under Load	2 KV Max.
d. Spark Plug Var. No Load	3-6 KV Max.
e. Spark Plug Firing Volts @ 1000 RPM	8-15 KV
f. Dwell Var. @ 1000 RPM	3° Max.

g. Test ignition cable resistance only if a,b,c,d, or e is out of spec. Resistance 8,000 Ohm per ft. max.

7. CHECK DWELL ANGLE

BREAKER POINT TYPE - 1968-1974

ENGINE	SPEC.
4-152, 4-196	68-72°
BG-220, 241, 265	28-35°
V-226, 304, 345, 392, 400	28-32°
6-232, 6-258	31-34°

8. IGNITION TIMING

1968 THRU 1979

CONDITION: Disconnect and Plug Dist. Vac. Advance Hose. Run engine at specified idle RPM.

ENGINE	SPEC. OLD	SPEC. NEW
4-152, 4-196 BG-220, 241, 265 6-232, 6-258, V-304 345, 392	TDC	2° BTDC
V-266	2° ATDC	2° BTDC
V-400	5° BTDC	7° BTDC
1980		
4-196	TDC	5° BTDC
V-304	10° BTDC	12° BTDC
V-345	7 1/2° BTDC	12° BTDC

9. CURB IDLE ADJUSTMENT

CONDITION: Normal Operating Temp.

ENGINE	SPEC. MANUAL	SPEC. AUTO
ALL	700	700

10. ADJUST IDLE (CO) W/ANALYZER

CONDITION: Clamp off air injection hoses

ENGINE	SPEC'S. 1968-74	79	80*
ALL	1.0%		
4-196		.3-1.5%	1.5-3.0%
V-304		.1-.8%	.4-1.0%
V-345		.1-.8%	.5-1.5%

* Measured at air injection manifold.

11. ADJUST IDLE (CO) W/O ANALYZER

Idle Drop Method:

ENGINE	SPEC'S. 1968-74	79	80
ALL	40 RPM		
4-196		40 RPM	30 RPM
V-304		60 RPM	85 RPM
V-345		60 RPM	100 RPM

co[illegible]letio[illegible] tu[illegible]p, [illegible]all [illegible]h a[illegible]de [illegible]ssio[illegible]aher per instructions.

CUMMINS HEAVY DUTY TRUCKS

Adjust the fuel manifold (rail) pressure according to the following table and procedure. CPL number, rated engine speed, and altitude at which the engine is used determine the correct rail pressure from the table. If the rated rail pressure is lower than that given in the table (as in the case of a derated engine) no adjustment is necessary. If the engine is older than those listed in the table, reduce the rail pressure about 3 percent for each 1000 feet above 500 feet.

Engine Family	CPL	Cubic Inch Displacement	Year Certified	RPM	Maximum Rail Pressure (PSI)*	Adjusted Rail Pressure (PSI) @ Altitude 4000 feet	6000 feet	8000 feet	10,000 feet
091	0026	855	1975-1982	2300	213	190	178	165	152
091	0026	855	1975-1982	2100	182	163	152	141	130
091	0026	855	1975-1982	1950	176	160	149	139	128
091	0026	855	1975-1982	1800	110	110	110	110	110
171	0126	903	1975-1978	2600	191	171	159	148	137
171	0126	903	1975	2400	165	164	153	142	131
171	0105	903	1975-1976	2500	123	123	123	123	123
171	0282	903	1977-1978	2600	192	172	160	149	137
171	0341	903	1978	2600	185	166	154	143	132
201	5004	378	1975-1978	3300	135	103	93	81	71
211	5003	504	1975-1978	3300	145	106	93	80	69
211	5003	504	1975-1978	3000	113	88	77	68	58
221	5005	555	1975-1982	3300	163	125	110	96	83
221	5005	555	1975-1982	3000	141	111	97	85	73

*Maximum fuel manifold pressure (rail) corresponds to the certified EPA family maximum fuel rate

PROCEDURE:

- o Attach pressure gauge (PN 3375932) to the fuel pump valve outlet port.
- o Operate the engine until all systems reach operating temperature. Be sure all fuel passages are cleared of air.
- o Disconnect the vehicle throttle control linkage at the throttle lever. Move the lever clockwise against the throttle stop.
- o With engine running, open the throttle slightly by hand to obtain 200 to 300 rpm above normal engine idle speed.
- o Snap the throttle lever to the full open position (high idle) and accelerate the engine to maximum speed.

continued

CUMMINS HDT continued

PROCEDURE continued

- Observe and record the momentary maximum rail pressure. Repeat the procedure several times to verify the reading. (This reading is the "Snap Rail Pressure".)

- On newer models, remove the ball from the end of the throttle shaft. Avoid damage to the adjusting screw. Turn the pressure adjusting screw clockwise to reduce the snap rail pressure to the value shown in the table. NOTE: Do not change the position of the throttle stop screws in the fuel pump body. (CPL number and rated rpm are shown on the engine dataplate.)

- On older models, remove the throttle shaft from the fuel pump housing and change the shims in the fuel adjusting plunger to change the snap rail pressure.

- Adjust the final rail pressure by changing the position of the rear throttle stop screw in the fuel pump body.

FORD HEAVY DUTY TRUCKS

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
84	4.9L	9-77J-R12	1	New PCV Valve EV-77 (D8TZ-6A666-A)
		9-78J-R00	2	Advance Timing 4°
		9-77S-R10 9-78J-R11	3 (C6 AT only)	Install Altitude Compensating Transmission Vacuum Diaphragm D8AZ-7A377-A Clip: D7FZ-7F006-A
			4	Adjust Idle
82	4.9L E,F Series		1	New PCV Valve EV-77(?)
			2	Advance Timing 4°
			4	Adjust Idle
	E,F Series	5.8M 5.8W 6.6M	2	Advance Timing 4°
			1	New PCV Valve (?)
			5	Relocate Choke Rod
			4	Adjust Idle
	E,F,C,L Series B Series Bus	6.0L 7.0L 7.5L	2	Advance Timing 4°
			1	New PCV Valve (?)
			4	Adjust Idle
81	E,F Series	4.9L	1	New PCV Valve (?)
			2	Advance Timing 4°
			4	Adjust Idle

continued

FORD HDT continued

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
81 cont'd	E,F Series	5.8M	2	Advance Timing 4°
		5.8W	1	New PCV Valve (?)
		6.6M	5	Relocate Choke Rod
			4	Adjust Idle
	E,F,C,L Series B Series Bus	6.1L	2	Advance Timing 4°
		7.0L	1	New PCV Valve (?)
		7.5L 7.8L 8.8L	4	Adjust Idle
70-80	all		2	Advance Timing 4°
			4	Adjust Idle & Fuel/Air Ratio

FORD HEAVY DUTY TRUCKS

PROCEDURE 1: Replace PCV Valve.

- o Remove the existing PCV valve and give it to the customer.
- o Install a new PCV valve of the part number listed.

PROCEDURE 2: Adjust Timing.

- o Setting given is an adjustment from low-altitude specifications.

PROCEDURE 3: Replace Transmission Vacuum Diaphragm.

- o Raise vehicle.
- o Remove existing transmission vacuum diaphragm.
- o Install high-altitude transmission vacuum diaphragm of the part number listed.
- o Lower vehicle.

PROCEDURE 4: Adjust Idle.

- o Adjust idle speed to low-altitude specifications.

PROCEDURE 5: Relocate Choke Rod.

- o Remove the choke plate lever screw.
- o Rotate the lever on the rod and reposition it on the inboard (high-altitude) hole.
- o Reinstall the choke plate lever with the screw.

GENERAL MOTORS HEAVY DUTY TRUCKS

Year	Model	Engine Family	Applicable Procedures	Replacement Part Number/ Specifications/Notes
82-84	All Gasoline		1	Advance Timing 4°
			2	Adjust Idle
	Diesel 71N Series		3 or 4	Install Load Limiter or Replace Injectors
	Diesel 8-2 Fuel-Pincher			Naturally aspirated Fuel-Pincher engines are to be used only at altitudes below 7500 ft. (49-state) or 5000 ft. (California). Above these altitudes, the turbo-charged Fuel Pincher must be used.
	6.2L	EGM06.2DAB1 DGM06.2DAB2 CGM06.2DAB3	5	Have Injection Pump Modified
	4L-53T 6V-53T 6L-71T 6L-71TA 6V-71TA 6V-72TA 8V-71TA 8V-72TA 6V-92TA 8V-92TA V8-8.2T		none	
81	All Gasoline		1	Advance Timing 4°
			2	Adjust Idle
70-80	All Gasoline		6	Set Choke Coils
			7	Reposition Choke Rod Lever
			8	Set Vacuum Break(s)
			1 (Cadillac, Chevrolet, GMC only)	Advance Timing 4°
			2	Adjust Idle
70-74	GMC	DH 478 DH 637	9	Turn Droop Screw

GENERAL MOTORS HEAVY DUTY TRUCKS

ALTITUDE ADJUSTMENT INFORMATION
MODEL YEARS 1970, 1971 AND 1972

ENGINE FAMILY	INJECTOR	INJECTOR TIMING	INJECTOR PART NO.	GEAR TRAIN TIMING (a)	FULL LOAD SPEED RANGE	LOAD LIMIT DEVICE LOCK NUT SETTING ABOVE PLATE	
						INCHES	NO. OF TURNS
L-53N (3 & 4-53N)	N40	1.460	5228763	Adv.Gear-Std.Cam	2800 Maximum	0.236	5-1/2
	N45	1.460	5228773	Adv.Gear-Std.Cam	2800 Maximum	0.175	4-1/4
	N50	1.460	5228783	Adv.Gear-Std.Cam	2800 Maximum	0.155	3-3/4
V-53N (6 & 8V-53N)	N40	1.460	5228763	Adv.Gear-Std.Cam	2800 Maximum	0.236	5-1/2
	N45	1.460	5228773	Adv.Gear-Std.Cam	2800 Maximum	0.175	4-1/4
	N50	1.460	5228783	Adv.Gear-Std.Cam	2800 Maximum	0.155	3-3/4
L-71N (4V) (3, 4 & 6-71N)	71N5	1.460	5228850	Standard	2100 Maximum (b)	0.155	3-1/2
	N55	1.460	5228785	Standard	2100 Maximum (b)	0.139	3-1/2
	N60	1.460	5228760	Standard	2100 Maximum (b)	0.108	2-1/2
	N65	1.484	5228900	Adv.Gear-Std.Cam	2100 Maximum (b)	0.082	2
	N70	1.460	5228770	Adv.Gear-Std.Cam	2300 Maximum	0.104	2-1/2
V-71N (4V) (6, 8 & 12V-71N)	71N5	1.460	5228850	Standard	2100 Maximum (b)	0.155	3-1/2
	N55	1.460	5228785	Standard	2100 Maximum (b)	0.139	3-1/2
	N60	1.460	5228760	Standard	2100 Maximum (b)	0.108	2-1/2
	N65	1.484	5228900	Adv.Gear-Std.Cam	2100 Maximum (b)	0.082	2
	N70	1.460	5228770	Adv.Gear-Std.Cam	2300 Maximum	0.104	2-1/2
V-71N (2V) (6V-71N Coach)	71N5	1.460	5228850	Standard	2100 Maximum	0.155	3-1/2
	N55	1.460	5228785	Standard	2100 Maximum	0.139	3-1/2
	N60	1.460	5228760	Standard	2100 Maximum	0.108	2-1/2

(a) Consult service manual when changing cam or gear timing.
(b) 2300 RPM full load speed is permitted for certain emergency vehicles.

GENERAL MOTORS HEAVY DUTY TRUCKS

ALTITUDE ADJUSTMENT INFORMATION
MODEL YEAR 1973
(49 - STATE)

ENGINE FAMILY	INJECTOR	INJECTOR TIMING	INJECTOR PART NO.	GEAR TRAIN TIMING (a)	FULL LOAD SPEED RANGE	LOAD LIMIT DEVICE LOCK NUT SETTING ABOVE PLATE	
						INCHES	NO. OF TURNS
L-53N	C40	1.460	5229340	Adv.Gear-Std.Cam	2800 Maximum	0.236	5-1/2
(3 & 4-53N)	C45	1.460	5229345	Adv.Gear-Std.Cam	2800 Maximum	0.191	4-1/2
	C50	1.460	5229350	Adv.Gear-Std.Cam	2800 Maximum	0.168	4
V-53N	C40	1.460	5229340	Adv.Gear-Std.Cam	2800 Maximum	0.236	5-1/2
(6 & 8V-53N)	C45	1.460	5229345	Adv.Gear-Std.Cam	2800 Maximum	0.191	4-1/2
	C50	1.460	5229350	Adv.Gear-Std.Cam	2800 Maximum	0.168	4
L-71N (4V)	71C5	1.484	5229352	Standard	2100 Maximum (b)	0.168	4
(3, 4 & 6-71N)	C55	1.460	5229355	Standard	2100 Maximum (b)	0.150	3-1/2
	C60	1.460	5229360	Standard	2100 Maximum (b)	0.117	3
	C65	1.484	5229365	Adv.Gear-Std.Cam	2100 Maximum (b)	0.189	4-1/2
	C70	1.484	5229370	Adv.Gear-Std.Cam	2300 Maximum	0.139	3-1/2
V-71N (4V)	71C5	1.484	5229352	Standard	2100 Maximum (b)	0.168	4
(6, 8 & 12V-71N)	C55	1.460 (c)	5229355	Standard	2100 Maximum (b)	0.150	3-1/2
	C60	1.460 (c)	5229360	Standard	2100 Maximum (b)	0.117	3
	C65	1.484	5229365	Adv.Gear-Std.Cam	2100 Maximum (b)	0.189	4-1/2
	C70	1.484	5229370	Adv.Gear-Std.Cam	2300 Maximum	0.139	3-1/2
V-71N (2V)	71C5	1.484	5229352	Standard	2100 Maximum	0.168	4
(6V-71N Coach)	C55	1.470	5229355	Standard	2100 Maximum	0.150	3-1/2
	C60	1.470	5229360	Standard	2100 Maximum	0.117	3

(a) Consult service manual when changing cam or gear timing.
(b) 2300 RPM full load speed is permitted for certain emergency vehicles.
(c) 1.470 inch for 8V-71N Coach engines.

GENERAL MOTORS HEAVY DUTY TRUCKS

ALTITUDE ADJUSTMENT INFORMATION
MODEL YEARS 1974 THROUGH 1978
(49 - STATE)

ENGINE FAMILY	INJECTOR	INJECTOR TIMING	INJECTOR PART NO.	GEAR TRAIN TIMING (a)	FULL LOAD SPEED RANGE	LOAD LIMIT DEVICE LOCK NUT SETTING ABOVE PLATE	
						INCHES	NO. OF TURNS
4L-53N 6V-53N	C40	1.470	5229340	Adv.Gear-Std.Cam	2800-2400	0.236	5-1/2
	C45	1.470	5229345	Adv.Gear-Std.Cam	2800-2400	0.191	4-1/2
	C50	1.470	5229350	Adv.Gear-Std.Cam	2800-2400	0.168	4
6L-71N 6V-71N 8V-71N	71C5	1.484	5229352	Standard	2100-1800 (b)	0.168	4
	C55	1.460	5229355	Standard	2100-1800 (b)	0.150	3-1/2
	C60	1.460	5229360	Standard	2100-1800 (b)	0.117	3
	C65	1.484	5229365	Adv.Gear-Std.Cam	2100-1900 (b)	0.189	4-1/2
	C70	1.484	5229370	Adv.Gear-Std.Cam	2300-1900	0.139	3-1/2
12V-71N	71C5	1.484	5229352	Standard	2100-1800	0.168	4
	C55	1.460	5229355	Standard	2100-1800	0.150	3-1/2
	C60	1.460	5229360	Standard	2100-1800	0.117	3
	C65	1.484	5229365	Adv.Gear-Std.Cam	2100-1900	0.189	4-1/2
6V-71N (2V) 8V-71N (4V) Coach	71C5	1.484	5229352	Standard	2100-1800	0.168	4
	C55	1.470	5229355	Standard	2100-1800	0.150	3-1/2
	C60	1.470	5229360	Standard	2100-1800	0.117	3
6V-92 8V-92	9270	1.460	5229170	Standard	2100-1950	0.270	6-1/2
	9275	1.460	5229380	Standard	2100-1950	0.230	5-1/2
	9280	1.460	5229180	Standard	2100-1950	0.200	5
	9285	1.460	5229400	Standard	2100-2100	0.160	4

(a) Consult service manual when changing cam or gear timing.
(b) 2300 RPM full load speed is permitted for certain emergency vehicles.

GENERAL MOTORS HEAVY DUTY TRUCKS

ALTITUDE ADJUSTMENT INFORMATION
MODEL YEARS 1975 THROUGH 1979
(CALIFORNIA)

ENGINE FAMILY	INJECTOR	INJECTOR TIMING	INJECTOR PART NO.	GEAR TRAIN TIMING (a)	FULL LOAD SPEED RANGE	LOAD LIMIT DEVICE LOCK NUT SETTING ABOVE PLATE	
						INCHES	NO. OF TURNS
MODEL YEARS 1975-1976							
6L-71N	71B5	1.500	5229550	Standard	2300-2300	0.231	5-1/2
	B55	1.508	5229555	Standard	2100-2100 (b)	0.186	4-1/2
	B60	1.508	5229560	Standard	2100-2100 (b)	0.163	4
	B65	1.484	5229565	Adv.Gear-Std.Cam	2100-2100 (b)	0.142	3-1/2
8V-71N	71B5	1.500	5229550	Standard	2300-2300	0.231	5-1/2
	B55	1.500	5229555	Standard	2100-1950 (b)	0.186	4-1/2
	B60	1.500	5229560	Standard	2100-2100 (b)	0.163	4
	B65	1.484	5229565	Adv.Gear-Std.Cam	2100-2100 (b)	0.142	3-1/2
6V-71N	7B5E	1.500	5229580	Standard	2100-2100	0.215	5
Coach	B55E	1.500	5229575	Standard	2100-2000	0.161	4
	B60E	1.500	5229570	Standard	2100-2100	0.150	3-1/2
8V-71N	71B5	1.500	5229550	Standard	2100-2000	0.231	5-1/2
Coach	B55	1.500	5229555	Standard	2100-1800	0.186	4-1/2
	B60	1.500	5229560	Standard	2100-2100	0.163	4
MODEL YEARS 1977-1979							
6L-71N	71B5	1.500	5229550	Standard	2100-1800 (b)	0.231	5-1/2
	B55	1.508	5229555	Standard	2100-1800 (b)	0.186	4-1/2
	B60	1.508	5229560	Standard	2100-1800 (b)	0.163	4

(a) Consult service manual when changing cam or gear timing.
(b) 2300 RPM full load speed is permitted for certain emergency vehicles.

GENERAL MOTORS HEAVY DUTY TRUCKS

ALTITUDE ADJUSTMENT INFORMATION
MODEL YEARS 1979 THROUGH 1984

ENGINE FAMILY	INJECTOR	INJECTOR TIMING	INJECTOR PART NO.	GEAR TRAIN TIMING (a)	FULL LOAD SPEED RANGE	LOAD LIMIT DEVICE LOCK NUT SETTING ABOVE PLATE	
						INCHES	NO. OF TURNS
6L-71N	7E50	1.484	5229785	Standard	2100-1800 (b)	0.200	5
	7E55	1.496	5229790	Standard	2100-1800 (b)	0.160	4
	7E60	1.484	5229795	Standard	2100-1800 (b)	0.120	3
	7E65	1.484	5229800	Std.Gear-Adv.Cam	2100-1900 (b)	0.190	4-1/2
	71B5	1.500	5229550	Standard	2100-1800 (b)	0.231	5-1/2
	B55	1.508	5229555	Standard	2100-1800 (b)	0.186	4-1/2
	B60	1.508	5229560	Standard	2100-1800 (b)	0.163	4
8V-71N	7E50	1.496	5229785	Standard	2100-1800 (b)	0.200	5
	7E55	1.496	5229790	Standard	2100-1800 (b)	0.160	4
	7E60	1.500	5229795	Standard	2100-1800 (b)	0.120	3
	7E65	1.496	5229800	Adv.Gear-Std.Cam	2100-1900 (b)	0.190	4-1/2
6V-71N Coach	7E50	1.508	5229785	Standard	2100-1800	0.200	5
	7E55	1.496	5229790	Standard	2100-1800	0.160	4
	7E60	1.500	5229795	Standard	2100-1800	0.120	3
8V-71N Coach	7E50	1.496	5229785	Standard	2100-1800	0.200	5
	7E55	1.496	5229790	Standard	2100-1800	0.160	4
	7E60	1.500	5229795	Standard	2100-1800	0.120	3

MODEL YEAR 1980

8.2 Liter

Naturally aspirated 49-state 8.2 Fuel Squeezer engines can operate without modification up to 7,500 feet elevation and engines certified for use in California can operate up to 5,000 feet elevation. Above these altitudes, turbocharger 8.2 Fuel Squeezer engines should be used.

(a) Consult service manual when changing cam or gear timing.
(b) 2300 RPM full load speed is permitted for certain emergency vehicles.

GENERAL MOTORS HEAVY DUTY TRUCKS

PROCEDURE 1: Adjust Timing.

- Settings given assume low-altitude specifications as the base condition. Given specification is maximum adjustment; use only if no detonation results.

PROCEDURE 2: Adjust Idle.

- Adjust idle mixture and speed to low-altitude specifications or to given alternative specifications. If the carburetor mixture screws are covered by metal plugs, do not adjust mixture.

PROCEDURE 3: Install Load Limiter.

- Follow the instructions Steps 1-6 in Section 14.14 of the service manual.
- Set the load limit screw lock nut as in Step 7 using the attached table. The limiter can be readjusted to either improve performance or further reduce smoke.
- Complete Steps 8 and 9 of the above instructions.
- Caution the owner that the power output of the engine has been restricted.

PROCEDURE 4: Replace Injectors.

- Remove injectors.
- Install injectors of the next smaller size as shown on the attached table.
- Adjust cam and gear timing, if required, as shown on the chart.

PROCEDURE 5: Have Injection Pump Modified.

- Remove the injection pump. Be sure to note the relationship of the timing marks on the pump and front housing. The pump must be reinstalled into this exact position.

continued

PROCEDURE 5 continued

- o Send the pump to an ADS Service Center for the high-altitude adjustment.
- o Reinstall the pump into its original timing setting. If the original relationship was not retained, retime the pump.

PROCEDURE 6: Set Choke Coils.

NOTE: Disregard if choke is sealed or already set at the lean limit.

- o Set choke coils one notch leaner than specifications.

PROCEDURE 7: Reposition Choke Rod.

- o Remove the choke plate lever screw.
- o Reposition the rod to the altitude hole.
- o Reinstall the screw.

PROCEDURE 8: Set Vacuum Break(s).

- o Set vacuum break(s), if so equipped, to the following specifications:
  - Angle Gage: 2^{o} more (leaner) than specified.
  - Plug Gage: 0.015 inch more (leaner) than specified.

PROCEDURE 9: Turn Droop Screw.

- o Unscrew the four bolts on the top cover of the fuel injection pump and remove it.
- o Turn the droop screw up to one full turn clockwise (in.).
- o Reinstall the cover.

HINO HEAVY DUTY TRUCKS

1984 High altitude adjustment on all 1984 HINO engines involves removing the injection pump, adjusting the injection volume and timing to the following specifications, then reinstalling the pump.

PROCEDURE:

- Remove the splashboard (EM100E only).
- Remove the engine room cover (EM100E only).
- Remove the air intake pipe (EM100E only).
- Remove the oil level gauge guide support.
- Disconnect the lever link.
- Disconnect the fuel pipe.
- Disconnect the oil pipe.
- Disconnect the high pressure pipe.
- Remove the injection pump setting bolt. Use special tool 90819-1707 (EM100E) or 09819-3004 (H07C-B+C).
- Remove the injection pump assembly.
- Set up the pump on the pump tester at the following conditions:

Test Condition

Diesel fuel feed pressure	2.0 kg/cm^2
High pressure pipe	$\phi 2 \times \phi 6 \times 600$ mm
Turning direction	Right hand seen from drive side
Diesel fuel temperature	40 - 45° C
Calibration nozzle	12SD12 (BOSHCH NO.)
Nozzle opening pressure	175 kg/cm^2

HINO HDT continued

PROCEDURE continued

- Adjust the full load stopper so that the injection volume agrees with that in the following table:

Calibration Standard

Engine Model	Max. Altitude (feet)	Pump Speed (rpm)	Injection Volume (cc/200 stroke)	Injection Timing
EM100E	4,000 - 5,000	1,350	18.1 ± 0.6	15° BTDC
H07C-B	4,000 - 5,500	1,500	13.7 ± 0.4	17° BTDC
H07C-C	4,000 - 5,500	1,500	14.1 ± 0.4	11° BTDC

- Set the injection timing according to the table.
- Install the injection pump assembly.
- Reconnect the high pressure pipe.
- Reconnect the oil pipe.
- Reconnect the fuel pipe.
- Reconnect the lever link.
- Reinstall the oil lever gauge guide support.
- Reinstall the air intake pipe (EM100E only).
- Reinstall the engine room cover (EM100E only).
- Reinstall the splashboard (EM100E only).

Non-turbocharged Diesels:

PROCEDURE 1: (All non-turbocharged diesels).

- o Inspect that fuel is free of water, ice, clouding, and of correct grade.
- o Inspect fuel filter(s) and replace if necessary.
- o Inspect for and correct any external leakage of fuel, oil, air, or coolant.
- o Check and adjust accelerator linkage with engine off. Throttle level should contact hi-idle stop when pedal is fully depressed.
- o Check and adjust shut-off cable with engine off to full run position.
- o Check and adjust low-idle rpm, high-idle rpm and no-load rpm (with engine warm) to the specification on the label on the rocker arm cover.
- o Check air cleaner restriction and replace element if necessary.

PROCEDURE 2: (If engine performance has been poor or if there is excessive exhaust smoke).

- o Check and adjust timing to specifications on label.
- o Check injection nozzles and correct any deficiencies.
- o Check and correct any deficiencies in inlet vacuum and outlet transfer pump fuel pressures.
- o Check and adjust intake and exhaust valve tappet clearances.
- o Check crankcase pressures at full load and rated rpm. Correct any deficiencies.
- o Check exhaust back pressures at full load and rated rpm. Correct any deficiencies.

PROCEDURE 3a: (9.0L and D-190 Engines Only).

- o Remove the seal wire from the maximum fuel adjusting nut.
- o Loosen the locknut and turn the adjusting stud clockwise 1/2 turn (180°).

continued

INTERNATIONAL HARVESTER HDT continued

PROCEDURE 3a continued

- o While holding the stud in its new position with a wrench, tighten the locknut.
- o Install a new seal and seal wire.

PROCEDURE 3b: (DV-550 Engines Only).

- o Remove seal wire.
- o Remove torque capsule cover and gasket.
- o Remove end nut and lock bracket.
- o Loosen max fuel adjustment locknut.
- o Turn max fuel adjusting nut clockwise 1/2 turn (180°).
- o While holding the adjustment nut in its new position with a wrench, tighten the locknut.
- o Reinstall the lock bracket and end nut, tighten the end nut.
- o Reinstall the torque capsule cover and gasket.
- o Install a new seal wire and seal.

PROCEDURE 3c: (DV-550 Engines Only).

- o Remove the lead seal and seal cap from max fuel stop screw.
- o Loosen locknut.
- o Turn max fuel stop screw out 1/2 turn (180° counterclockwise).
- o While holding the screw in its new position with a suitable rod or allen wrench, tighten the locknut.
- o Reinstall the locknut.
- o Install a new seal and seal cap.

continued

INTERNATIONAL HARVESTER HDT continued

PROCEDURE 3d: (6.9LD Engines Only).

- o Remove the injection pump.
- o Have the pump recalibrated by an authorized ADS service center, IH service center, or Stanadyne Corporation facilities.
- o Reinstall the injection pump.

PROCEDURE 4: (If engine is still under warranty).

- o Check high-altitude modifications.
- o Install new governor seals.

Turbocharged Diesels: No modification required.

Gasoline Powered: See chart.

INTERNATIONAL HARVESTER HEAVY DUTY TRUCKS

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PROCEDURES

1. PERFORM FOLLOWING ITEMS BEFORE TUNE-UP

A. Inspect all vacuum hoses of emission system.
B. Check air cleaner element.
C. Check PCV valve.
D. Clean flame arrestor.
E. Check vapor storage canister filter (Calif. engines).
F. Inspect modulated air cleaner.
G. Check drive belt tension.
H. Check breaker points and condensor (Conv. Ign.).
I. Lubricate breaker cam (Conv. Ign.).
J. Inspect distributor cap and rotor.
K. Torque carburetor mounting bolts.
L. Torque manifold bolts.
M. Check spark plugs.

Engine	Year	Gap
4-196	1970-71	0.030"
4-196	1975-78	0.035"
6-232/258	All	0.035"
RD-308	All	0.030"
V-301/345/392	All	0.030-0.035"
MV-401/446	All	0.030"
RD-406/450/501	All	0.030"
V-401/478/549	All	0.030"
V-537	All	0.030"

N. Check and record cylinder compression.

1	2	3	4	5	6	7	8
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2. HOOK-UP INSTRUMENTATION

Scope, Timing light, Vacuum gauge, Tachometer, and Dwell gauge

Per Mfg. Recommendation

3. ENGINE WARM-UP

A. Set choke at fast idle position _____
B. Run engine for five minutes _____

4. EGR FUNCTIONAL TEST

CONDITIONS: High Idle Rpm.

A. Record RPM W/O EGR _____
(Temporarily Pinch or Plug Vacuum Hose)
B. Record RPM W/EGR Functioning _____
C. RPM Difference _____

NOTE: No RPM Drop - Repair EGR System per Service Procedure.

5. AIR PUMP FUNCTIONAL TEST

A. Disconnect hose(s) from air pump.
B. Run engine at fast idle.
C. Check for discharge of air from air pump.

NOTE: No Air - Repair Air Injection System per Service Procedure.

6. IGNITION SYSTEM TESTS

TEST:

A. Cranking Coil Output 20-25 KV
B. Coil Output at 2500 RPM 20 KV Min.
C. Spark Plug Var. Under Load 2 KV Max.
D. Spark Plug Var. No Load 3-6 KV Max.
E. Spark Plug Firing Volts @ 1000 RPM 8-15 KV
F. Dwell Var. @ 1000 RPM 3° Max.
G. Test ignition cable resistance only if A, B, C, D, or E is out of spec. Resistance 8,000 Ohm per ft. max.

7. CHECK DWELL ANGLE

BREAKER POINT TYPE

Engine	Dwell Degrees
4-196	68-72°
RD-406/450/501	31-34°
6-232/258, RD-308	31-34°
V-301/345/392, V-401/478/549	28-32°

Electronic Ignition Dwell Check is Not Normally Needed.

8. IGNITION TIMING

CONDITION: Disconnect and Plug Dist. Vac. Advance Hose. Run engine at specified idle RPM.

Engine	Model Year(s)	Old	New
4-196	All	TDC	2° BTDC
6-232/258	1970-73	TDC	2° BTDC
6-258	1974	5° BTDC	7° BTDC
RD-308,RD-406/450/501	All	5° BTDC	7° BTDC
V-301/345*/392*	All	TDC*	2°*BTDC
*V-345 Non-Governed	1979 & Later	5° BTDC	7° BTDC
*V-392 Non-Governed	1975	5° BTDC	7° BTDC
V-401/549, V-537	All	7° BTDC	9° BTDC
V-478	1970-71	10° BTDC	12° BTDC
V-478	1972-74	7° BTDC	9° BTDC
V-478	1975 & Later	12° BTDC	14° BTDC
MV-404	All	9° BTDC	11° BTDC
MV-446	All	5° BTDC	7° BTDC

9. CURB IDLE ADJUSTMENT

CONDITION: Normal Operating Temp. & Trans. in Neutral.

Engine	Model Year(s)	RPM
4-196	1970-71	700
4-196	1975	550
RD-308,RD-406/450/501,V-478/549	All	500
6-232	All	700
6-258	1972-73	700
6-258	1974	600
V-401	All	600
MV-404/446, V-537	All	550
V-304*/345*/392*	1970-78	700
*V-304/345/392 (Loadstar)	1970-71	550
V-345/392	1979 & Later	650

10. ADJUST IDLE (CO) W/ANALYZER

CONDITION: Clamp off air injection hoses.

Engine	Model Year(s)	Idle CO
All 6-Cylinder Engines	All	2.5-3.0%
All 4-Cylinder & V-8 Engines	All	1.0-1.5%

11. ADJUST IDLE (CO) W/O ANALYZER

Idle Drop Method:

Engine	Model Year(s)	Speed Drop RPM
All	1970-74	40
4-196	1975 & Later	30
V-301	1977 & Later	80
V-345	1977 & Later	60 Non-Governed
V-345	1977 & Later	110 Governed
V-392	All	40
MV-404/446	1975-76	25
MV-401/446	1977 & Later	50
V-537	1975 & Later	25

On completion of tune-up, install high altitude emission label per instructions.

ISUZU HEAVY DUTY TRUCKS

Engines with an averiod compensator on the rear of the injection pump require no modification for high-altitude operation. Use the following procedure for all others:

PROCEDURE:

- Remove the seal which binds the full load set bolt and locknut to the governor housing.
- Loosen the locknut.
- Turn the full load set bolt 1/4 turn clockwise (90^{o}) for a turbocharged engine or 1/2 turn clockwise (180^{o}) for a naturally aspirated engine.
- While holding the bolt in place, fully tighten the locknut.
- Pass wire (PN 5157292480) and seal (PN 5157292490) or equivalent through the full load set bolt, locknut, and governor housing. Seal.

IVECO HEAVY DUTY TRUCKS

PROCEDURE:

- Remove the fuel injection pump from the engine.
- Install the pump on the test rig.
- Adjust rack travel to reduce fuel injection delivery 1% for every 500 feet of altitude at rated speed. Be sure that the reduction in delivery is of the same order at max torque speed as at rated speed. If necessary, set the torque control spring pre-load to obtain the required delivery.
- Reduce the GVW rate by 1/2 of the percent rate of fuel reduction.
- Reinstall the injection pump.

MITSUBISHI HEAVY DUTY TRUCKS

Year	Engine Family
1977-1980	6DR5
1981	BMM0243DAA3
1983	DMM0243DAA2

PROCEDURE:

- Remove the injection pump.
- Position the pump on a test bench with the following specifications:
  - Injection Nozzle: ND-DN12SD12A
  - Nozzle Opening Pressure: 175 kg/cm^2 (2,487 psi)
  - High Pressure Pipe: ø2.0 x ø6.0 x 600 mm (ø0.079 x ø0.236 x 23.6 in.)
  - Fuel Feed Pressure: 2.0 kg/cm^2 (28.4 psi)
  - Testing Fluid: No. 2-D Diesel Fuel
  - Testing Temperature: 40 ± 5°C (104 ± 9°F)
- Adjust fuel delivery to 33 ± 1 mm^3/stroke at 1100 rpm.
- Reinstall the injection pump.

PERKINS HEAVY DUTY TRUCKS

No modifications are necessary for high-altitude operation of turbocharged diesel engines. The following procedure is for naturally aspirated engines only. It should be performed by an authorized fuel pump specialist or by a Perkins distributor.

PROCEDURE:

- Reduce the fuel delivery rate according to the following table:

Altitude m(ft.)	Maximum Fuel Delivery Reduction
0 - 600 (0 - 2000)	No change
600 - 1200 (2000 - 4000)	6%
1200 - 1800 (4000 - 6000)	12%
1800 - 2400 (6000 - 8000)	18%
2400 - 3000 (8000 - 10000)	24%
3000 - 3600 (10000 - 12000)	30%

CUSHMAN CYCLE

1978 - 1983

Install Carburetor Modification Kit, PN 886771. Instructions are included in the kit.

HARLEY DAVIDSON CYCLE

Install the high altitude kit listed below by following the instructions included with it.

Model	Kit Number
FLH-1200	27094-78
FX	27095-78
FXE	27095-78
FXS-1200	27095-78
XLH	27096-79
XLCH	27096-79
XLCR-1000	27096-79
FLH-80	27093-78

LAVERDA CYCLE

1983 1000 RGS

1981 - 1982 Jota, Mirage

PROCEDURE:

- o Turn off the engine.
- o Turn off both fuel tank petcocks.
- o Put a drain pan under the carburetor assembly.
- o Remove the float bowl hex nuts on one carburetor.
- o Remove the main jet.
- o Install main jet PN 62-500-322.
- o Remove the idle jet.
- o Install idle jet PN 62-500-331
- o Reinstall the float bowl.
- o Repeat the above steps on the remaining two carburetors.
- o Open the fuel tank petcocks and check for leaks.
- o Start the engine and check for leaks.
- o Adjust idle CO and rpm, if necessary, to low altitude specifications.

TRIUMPH CYCLE

Replace the main jets in the carburetor with the following:

1978, 1979: Part number 99-0446

1981, 1982, 1983: Part number 99-7599